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SOUND IMAGE

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TO AUDIO & AV
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Vol.28 #4
JUNE/JULY 2015



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MUNICH HIGH END REPORT

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audition, say
Australia's
top dealers



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35

YEARS OF
PASSION &
INNOVATION

18

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Magellan



Esprit



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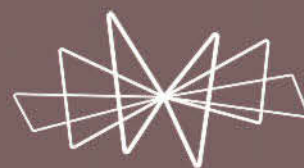
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16



Our man in Munich
picks the best of High End

26



ROUNDTABLE

TRY BEFORE YOU BUY

Hi-Fi dealers discuss the art of demonstration

86



BLU-RAY REVIEWS

HUNGER GAMES IN ATMOS

"The best surround soundtrack ever..."



REVIEWS

Musical Fidelity Merlin compact system 40

Our cover star is a compact system delivering Bluetooth streaming, USB computer playback and, hoorah, a very nice turntable for spinning LPs. This is, as they say, what we want.

Marantz NA8005 network music player 44

Network and online streaming, plus DAC duties, all at Marantz component quality. Nice.

Epson LS10000 AV projector 48

It's a fine projector using laser LED lights, but it does get unnecessarily jiggly with its pixels.

Philips 58PUT8509 4K/UHD television 52

Philips TVs are back in Australia, and this 4K TV is a great way to welcome them back.

Sony SS-SC3P stereo loudspeakers 56

Sony allows Australia one of its two-channel treats which so rarely leave the homeland.

LG H4 (NP8350) portable multiroom player 64

This little Bluetooth-equipped portable is a useful addition to LG's Music Flow system.

PVRs

Humax HDR-3000T personal video recorder 59

Unusual design outside, but Humax's normal talents for effective PVR design are inside, along with network support and more...

Beyonwiz T4 personal video recorder 62

Four tuners capable of recording 10 channels, and plenty of media wizardry to boot — Beyonwiz delivers another great PVR.

USB DACs

Arcam irDAC 70

Denon DA-300USB 72

Silverstone EB01-E 74

AudioQuest DragonFly 1.2 78

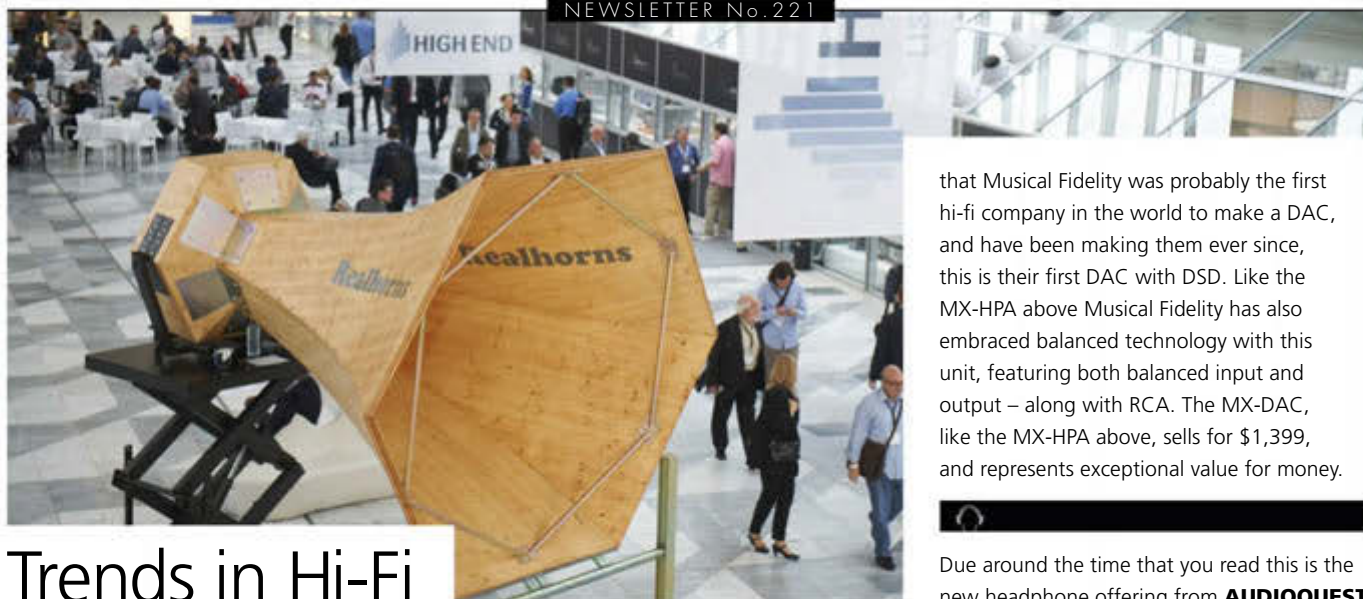
Cambridge Audio DacMagic XS 78



LEN WALLIS AUDIO

THE HI-FI HEADLINES

NEWSLETTER No. 221



Trends in Hi-Fi

Traditionally most of the Hi-Fi sold in Australia originated in the UK, USA or Japan. In recent years we have seen a notable swing to Europe, and having recently attended the Hi-End Audio show in Munich, I believe that this trend will continue.

Of immediate interest to us is France. We have extolled the virtues of French speaker manufacturer Focal for decades. Recently we have come across yet another very high quality French speaker manufacturer – Triangle. I am somewhat surprised that Triangle have never become a recognised brand in this country (although I am sure this is about to change). They have been producing speakers for over 35 years, the range is extensive, the quality is obvious, and they have pioneered many of the innovations in speaker design that we now take from granted.

The current push into new markets has coincided with a change in company ownership, and the subsequent increased spend on R&D. Triangle have just released three ranges of speakers on the Australian market – the Esprit series, the Signature Series, and their top of the range Magellan Series. These models range from a little over \$3,000 through to \$55,000, and there will be two more ranges covering the lower end of the market arriving before the end of this year.

This is a brand that you will hear a lot more about in the future.

MUSICAL FIDELITY has turned small format ‘add-on’ hi-fi components into an art form. Think X10D, X-Can, V-LPS, etc. – these and dozens more like them are all small-form products that have been very successful.

Musical Fidelity has recently announced an upgrade for their ‘M1’ Series, called the MX Series, and once again these are housed in smaller than traditional component sized chassis – although this time the shape is a little more conventional.

The first to arrive is the MX-HPA – a fully balanced headphone amplifier. While not many people have been exposed to Balanced Headphones the technology has been around for some time – US manufacturer Blockhead released a balanced headphone amp back in 2001, and a handful of others have followed suit since. Balanced headphones are also thin on the ground, so Musical Fidelity are about to release their MF-200B (for balanced) model. This will coincide with the release of a second balanced headphone amp, the lower priced V90-BHA – a new product which will join the even smaller, and very popular ‘V’ series of products.

In case you are concerned that the MX-HPA will not suit your existing headphones, MF was smart enough to ensure that it will also accept conventional 6.5mm plugs.

The MX-HPA is due to be joined by the MX-DAC. Musical Fidelity have built a very enviable reputation for producing high quality, yet very affordable, DACs. Despite the fact

that Musical Fidelity was probably the first hi-fi company in the world to make a DAC, and have been making them ever since, this is their first DAC with DSD. Like the MX-HPA above Musical Fidelity has also embraced balanced technology with this unit, featuring both balanced input and output – along with RCA. The MX-DAC, like the MX-HPA above, sells for \$1,399, and represents exceptional value for money.

Due around the time that you read this is the new headphone offering from **AUDIOQUEST** – the Nighthawk. This is Audioquest’s first foray into headphone manufacturing, and I was a little surprised to witness the level of attention to detail that has gone into this product. This is much more than a ‘me too’ product, jumping on the burgeoning headphone boom. The temptation, as many companies will admit, is to go to one of the many Asian manufacturers and brand stamp something that comes out of that factory. Not so with AudioQuest, there has been a lot of R&D go into this product – and it shows. At \$899 they are not a cheap headphone, but they are worth every penny.

Herb Reichert from the very influential publication *Stereophile* summed up the Nighthawks by commenting “*The Nighthawks had me choking back tears of musical appreciation.*”

The **PEACHTREE** Nova 125SE integrated amplifier has been reduced in price:

The Nova 12SE is a 125-watt/channel amplifier, DAC and headphone amp all rolled into one. It features five inputs – one analogue, two Toslink optical digital, one coaxial digital and a 24-bit asynchronous USB input to connect with your computer or laptop. It also features a switchable valve pre-amp buffer stage – part of the reason that this range is renowned for its warmth of sound – and a high quality headphone pre-amplifier. Now \$1,999 in black (down from \$2,299) and \$1,899 in Cherry or Rosewood.

contents

VOL. 28#04

JUNE-JULY 2015



4K/ULTRA HIGH DEFINITION

- p16** 4K Blu-ray specs finalised – players & movies for Xmas?
- p23** Paul Gray on UHD, deep colour, high frame rate and more...
- p52** Philips 58PUT8509 58-inch UHD TV on test
- p84** Signs of light at the end of the 4K broadcast tunnel

82



UNCONVENTIONAL REFLECTIONS

So why shouldn't you have four tweeters per speaker?

LOUDSPEAKERS

WELCOME

Our new Sound+Image buying guide is out for the year. We've listed all still-available products in each category, starting with speakers, PVRs, and more.

Loudspeakers

Every model listed here has won a Sound+Image award – for design and each offers top-value performance at its price. You can change the pricing, so check with your dealer or the manufacturer's website for more details.

Make and model	Price	Year	Website
Edifier Audio S-520	\$199	2015	www.edifier.com.au
Klipsch Reference R51	\$299	2015	www.klipsch.com.au
Yamaha NS-P250	\$299	2015	www.yamaha.com.au

based on the Awards we give to products, but we'll be varying the featured products, headphones, DACs and soundbars.

by represent the height of loudspeaker, neither low or high. Different finishes, manufacturers' website for more details.

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Music, modern design, gorgeous wood, vibrant plastic, sleek imaging, and high, glorious mid.

Music, modern design, gorgeous wood, vibrant plastic, sleek imaging, and high, glorious mid.

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SOUND+IMAGE BUYING GUIDE

**HUNDREDS OF PRODUCTS
AND EVERY ONE A WINNER...**

92

features & regulars

- EdLines** 10
The Editor explains why he's perfectly happy listening to midrange hi-fi equipment.

- News** 13
 - Triangle – from France to Australia
 - HEOS by Denon gets new gear and Bluetooth
 - LG expands its Music Flow system
 - Panasonic adds to AllPlay
 - 4K Blu-ray specs are finally released...
 - Astell & Kern goes Junior
 - Focal's Sopra No.2 speakers, in orange
 - OpenLIVE, Australia's new CD-quality service

SHOW REPORT

- High End Munich** 18
Edgar Kramer is living the high life in Munich, soaking up the sounds, picking his faves.

ANALYSIS

- From 4K to 'UHD': Paul Gray** 23
Our favourite researcher delivers a keynote for IFA, outlining the path from mere pixel numbers marketing of 4K to a true 'Ultra HD' experience.

ROUNDTABLE

- Showrooms & The Art of Demonstration** 26
We asked leading hi-fi and AV dealers whether hi-fi shoppers should still try before they buy. That would be a yes...

COMMENT

- Unconventional Reflections** 82
Geoff Forgie considers the possibility of life without the sweet spot.

COMMENT: SOUNDOFF

- Unblocking the 4K Pipe** 84
Derek Powell backtracks on his earlier predictions of 4K disaster after gathering fresh news on UHD broadcasting.



- Blu-ray reviews** 86
Stephen Dawson is bouncing off the ceiling at the quality of Atmos in 'The Hunger Games: Mockingjay pt1', and revels in the excellent 'Interstellar' before bathing in Kiwi blood for 'What We Do in The Shadows'...

WOW



Seeking the Wow moment or how I learned to stop worrying and love the midrange...

I am, clearly, fond of hi-fi — I've been hanging out on hi-fi mags since 1989, back when TVs were deeper than they were wide, we were still peering distrustingly at these new-fangled CDs, and we wouldn't have known an MP3 if it had slid from under its developmental rocks and bitten us on our collective posteriors. So I've been reviewing hi-fi (on and just occasionally off) for 27 years. 'Is it the best job in the world?' ask my hi-fi-loving friends. Well, I'm not complaining, obviously.

But it wasn't a love of hi-fi that brought me into hi-fi magazines in the first place. Rather it was a meeting point for two big themes of my life — music, in which I had been involved actively and passively pretty much since birth, since I was lucky enough to have a BBC music producer for a father, and electronics, which I had studied, also actively and perhaps sometimes a little too passively, at college. My first real jobs, bar teenage shelf-stacking at Kwik Save supermarkets and a big London bookshop, were playing with a band by night and fumbling through the deputy editorship of an electronics project magazine, *ETI*, by day. Later I shifted onto a UK midrange hi-fi magazine, where my combination of electronics knowledge and musical ear proved fairly useful.

Quite early in that job, I was 'promoted', not entirely willingly, to be Editor of a high-end audiophile magazine, whose experienced external contributors were almost unanimously horrified at finding themselves led by this youngster who couldn't unerringly identify a KT88 at a hundred paces. We succeeded in making some fine magazines using their knowledge and my editing, but after a year or so of that I developed a travel bug, ended up finding a Canadian missus, and turned up here on your Australian golden soil to which I have now pledged eternal allegiance.

All these years later, I still remain somewhat allergic to the high-end. Don't get me wrong — I love listening to it, but I don't review it much. Partly because it's all rather heavy and I live up 77 wooden steps (a handy excuse sometimes), but partly because I actually prefer reviewing midrange hi-fi, and even the entry level. It does mean spending time with some unlistenable bad products on occasion, but it also gives the opportunity to discover something which is a real surprise — attractively priced but performing far

better than expected. Reviewing products costing tens of thousands of dollars, on the other hand — well you'd hope they'd perform nigh-on perfectly wouldn't you? So with high-end you almost end up reviewing their faults — it's a bit flat here, or it doesn't play this file-type, maybe if I just upgrade this one cable — even if really, the bulk of the time it sounds glorious. Whereas a midrange cracker can be a really pleasant surprise, a proper unexpected 'wow' moment. It's those moments that really light up a reviewing life.

This happens in video as well as audio — I had a 'wow' moment not with 4K, but certainly when I lived with an OLED TV for the first time. (Even the missus had a wow moment with that one.) In a presentation I attended recently (see p23-25), Paul Gray, an analyst for DisplaySearch/IHS, notes that researchers are finding that things other than 4K resolution may have a bigger wow factor — high dynamic range, higher frame rates, even deep colour. As he says, resolution alone isn't *that* much of a 'wow' — and if you need a light on your receiver to tell you when Netflix is delivering 4K rather than full-HD, well, then something's missing! It's just not enough of a 'wow'.

I mention all this because I had just such a moment of midrange delight during the preparations for this issue, when I plugged up the Merlin system from Musical Fidelity. I had not expected too much from the pictures of the small oval speakers each with just a single BMR (balanced mode radiator) driver, but from the first note things sounded spectacularly sweet, as you can read in the review starting on p40.

When you find this sort of thing you want to shout it from the rooftops, or at the very least, slap it on the cover. Even though the Merlin is, as I write, running in parallel with my main system (which is a few notches above midrange), I'm currently prevaricating over whether I can hang on to the Merlin for one more week before packing it up and sending it back to the nice folks at Audio Marketing. Of course that's the other thing people always ask — 'Do you get to keep it all?' To which the answer is, unfortunately, no... one can delay occasionally, but one cannot keep. The job's not quite *that* good!

Cheers,

Jez Ford, Editor.

www.twitter.com/avhuboz



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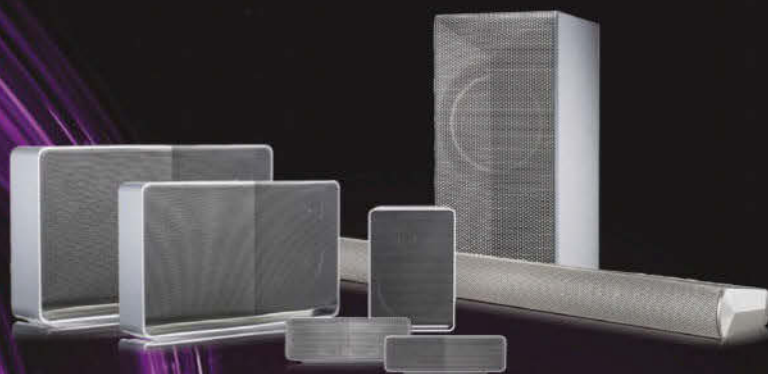




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Every
Room



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Googlecast

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"most of all LG impressed us by delivering an audio system that deserves recognition on its merits, not merely as a bolt-on to the company's excellent TVs."

SOUND
IMAGE

Find out more: lg.com/au/smart-hi-fi-audio

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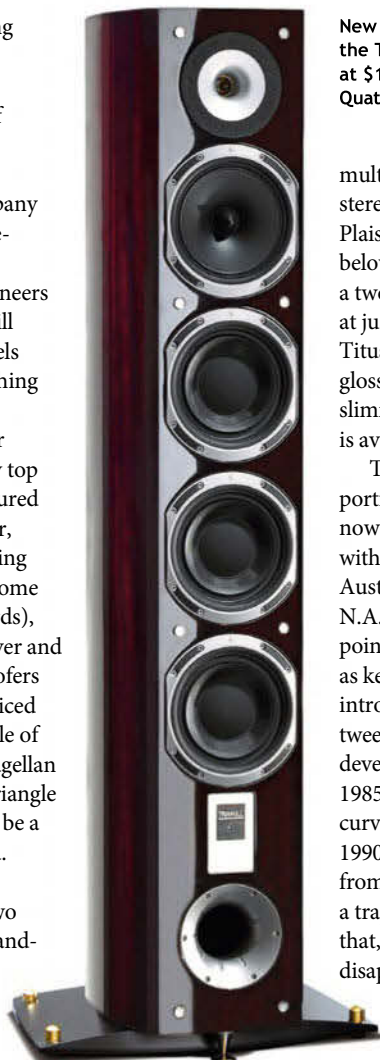


TRIANGLE shapes up for Oz

Audio Marketing has gained the Australian distribution of French brand Triangle, a wide-ranging and technology-led speaker company based in Picardy's Villeneuve-Saint-Germain, France.

Triangle designs and engineers its speakers in France, and still handcrafts its high-end models there. Its ranges cover everything from top-end loudspeakers to smaller models suitable for desktop listening. At the very top is the Magellan range — pictured right is the Magellan Quatuor, a floorstanding design featuring twin horn-loaded titanium dome tweeters (one facing backwards), one glass-fibre midrange driver and three 6.5-inch glass-fibre woofers in its 133cm-high cabinet, priced at \$29,990 a pair. The pinnacle of this range is the \$109,000 Magellan Grand Concert — the one Triangle speaker which we gather will be a 'special order' from Australia.

Below the Magellans, the Signature range comprises two floorstanding models, one stand-mount and a centre speaker (each of the Triangle ranges includes all you need for



New Triangles for Australia: the Titus EZ standmounts (top) at \$1699 and the Magellan Quatuor (left) at \$29,990.

multichannel as well as high-quality stereo listening). The Esprit EZ and Plaisir ranges provide an entry level below this — the Plaisir Lymna is a two-way bookshelf design priced at just \$899 a pair, while the Esprit Titus EZ (pictured above in white gloss finish) is \$1699 the pair. A slimmer version of this, the Heyda, is available for wall-mounting.

Triangle replaces Focal in the portfolio of Audio Marketing, now that Focal has consolidated with Naim to be distributed in Australia by New Zealand-based N.A.Distributors. Audio Marketing points to Triangle's strong research as key to the brand, it having introduced externally mounted tweeters in 1981's CX2 model, developing its own drivers since 1985, and claiming the first-ever curved speaker cabinets as early as 1990. The company name came from its very first design, which had a trapezoidal top enclosure. After that, however, the triangle shape disappeared — while the name remains. More info:

www.audiomarketing.com.au

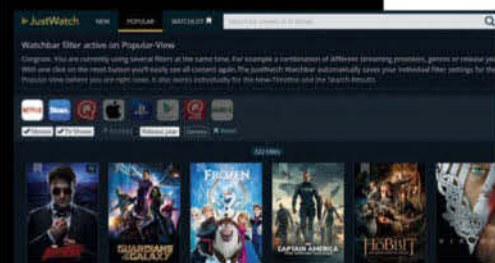
This 'AudioCanopy' employs stereo Sonos Play:3 wireless speakers incorporated into 'suspended architectural art' in a choice of wood-grain finishes, along with optional narrow-beam LED downlighting. It's made by CurveTec in Seattle, USA, where it sells for US\$2950; a sample shipping price to Sydney came in at \$596. www.audiocanopy.com



NEW-TECH '15

NEW-TECH STARTS JULY 31

The Australian Audio & AV Show has expanded this year to cover a wider range of technology — now titled 'New-Tech 15', it includes high-end audio sound lounges but also digital photo imaging, new science and tech, satellite navigation, mobile/in-car entertainment, eco-friendly and leisure technologies — a show for all the family and for all ages. Here at NextMedia we are again media partners for the show, which takes place from July 31 to August 2nd 2015 at Sydney Olympic Park in the new Hall 5 at the Sydney Show Ground. Tickets are on sale now: visit www.chestergroup.org for details.



WHAT'S ON NETFLIX?

JustWatch has launched here, providing a useful search and 'what's new' updates across streaming and download services including Netflix, Presto, Stan, iTunes, Google play, Quickflix, Mubi, Sony PlayStation and more. It's handy for finding the cheapest provider of a particular movie, as well as for comparing rival services and keeping up on the latest content. www.justwatch.com/au

LINN DS 'SPACE' UPGRADE

Owners of Linn DS streaming players can now receive software updates enabling a new feature, Space Optimisation. This "builds an acoustic model of a customer's room, based on their chosen speakers, their positioning, and the unique characteristics of their listening environment", then optimises the sound to "remove the unwanted distorting effects of their room, revealing the true sound of the music". The system works with specific speakers, which currently include B&W and KEF models, as well as Linn's own. An enhanced version, Space Optimisation+, works with the company's Exakt technology to model the unique characteristics of each individual drive unit. More info: www.advanceaudio.com.au

MULTIROOM UPDATE: NEW HEOS UNITS BRING BLUETOOTH

The HEOS by Denon wireless multiroom system is set to expand with the addition of three new products — a soundbar and subwoofer solution (the HEOS HomeCinema), a smaller portable speaker, the HEOS 1, and an intriguing shift sideways with the HEOS Drive multiroom amplifier.

Added Bluetooth

And hidden among the specs is an interesting nugget which could prove a game-changer for the whole HEOS system — you can add a USB-to-Bluetooth adaptor to any of the standard range in order to stream direct to the speaker from your smart device.

This adds significantly to their abilities. Currently HEOS units receive only via Wi-Fi or Ethernet, and operate entirely through the dedicated HEOS app (see our April-May issue for our full review of HEOS and other multiroom systems). While the HEOS app offers direct access to Spotify, Deezer, TuneIn internet radio and Pandora, the addition of Bluetooth reception will allow HEOS owners to use absolutely any music app of their choice and beam the results point-to-point to a HEOS unit.

As with the minijack input on HEOS units, the Bluetooth input on one HEOS unit should also be accessible to other HEOS units in the home. Existing HEOS owners should be able to upgrade once the new firmware and USB dongle become available.

HEOS 1 & the 'Go' Pack

This point-to-point reception becomes essential for the HEOS 1 speaker unit (pictured right), as it can be used in portable mode through the addition of a 'HEOS 1 Go Pack'. This includes a battery pack with quoted six-hour battery life. The USB-to-Bluetooth dongle supplied as part of the Go Pack was a vital addition for this new portable unit to operate outside the home Wi-Fi zone.

The Go Pack also adds a Splashguard cover for the open connections area on the back of the HEOS 1 (which includes a minijack auxiliary input), raising

its waterproof rating from humidity and steam resistance to a higher IPX4 splashproof rating. The HEOS 1 is also pairable, as with the HEOS 3 speaker units, to operate in stereo. Pricing for Australia is not yet finalised, but estimated around \$349 for the HEOS 1 and \$149 for the Go Pack.

HEOS Home Cinema

A HEOS soundbar had always been on the roadmap, and the 82cm-long \$1499 HomeCinema (above) features four channels of amplification driving dual 20mm soft-dome tweeters and two rounded rectangular 13cm composite Kevlar mid-woofers, supported by a wireless subwoofer. It retains all the HEOS music streaming abilities, adding decoding onboard for soundtracks in Dolby Digital, Dolby Digital Plus and DTS, although this is a 2.1-channel system (you cannot currently use other HEOS speakers as rear satellites). Inputs include HDMI (in and out with ARC) optical, coaxial, one analogue, and USB.



HEOS Drive

The Drive (above) brings HEOS into the custom installer market, providing an eight-channel multiroom amplifier in a single 2U-tall rack-mountable chassis. It is able to deliver four separate HEOS zones, all controllable from the HEOS app on smart devices. The 70W amp channels can be bridged for higher power, while extensive inputs (two optical, two coax digital, four analogue and four USB) are made available throughout the HEOS network. Note, however, that Bluetooth USB dongles won't operate with the Drive, as it has no 'Connect' button, networking by Ethernet rather than Wi-Fi. RRP of the Drive will be \$3490.

It won't stop here, HEOS tells us, with further expansion plans under development from HEOS engineers including, of course, D&M's North Sydney office. More info: heosbydenon.denon.com/au





LG ADDS H4 PORTABLE & SOUNDBARS TO MUSIC FLOW SYSTEM

Music Flow is LG's wireless multiroom system, and this has also had new models launched since we went to press on last issue's review. We have already played with the new H4 portable (see p64 for our review), while two more soundbars have joined the ecosystem, which now comprises H3, H4, H5 and H7 speakers, the HS6 soundbar (LAS650M) at \$799, and the two new soundbars, the HS7 (LAS750M, \$899, pictured left), and the flagship HS9 (LAS950M, \$1299).

This last, the rangetopping HS9 soundbar, is quite a beast, 110cm long with three HDMI inputs and one output, and using nine speakers with a quoted 700W of power (no criteria given), including 175W to the wireless subwoofer, together able to deliver 7.1-channel audio.

Being part of the Music Flow range, the HS9 can also network-stream files up to 24-bit/192kHz with excellent file compatibility (FLAC, WAV, AIFF and ALAC all included), as well as streaming from online music services Spotify and Deezer (subscription) and TuneIn (free internet radio).

GoogleCast compatibility adds still more, all the Music Flow products now appearing as recipient speakers for apps including Pandora, Rdio and Google play, subject to a compatible operating system for the device running apps.

More information: www.lg.com.au

PANASONIC GROWS ALLPLAY

Panasonic has the third wireless multiroom system being taken to the next level, announcing the extension of its AllPlay system in Australia to include one soundbar, one new compact speaker, and most interestingly a complete micro system and a CD/radio speaker unit. These add to what was one of the smaller ecosystems comprising just the SH-ALL3 and SH-ALL8 speakers and the SH-ALL1C receiver unit.

The micro system and CD/radio speaker will potentially introduce wireless multiroom to a new set of customers — start with a CD/radio micro system, then add small wireless speakers elsewhere which can then stream not only from the usual online sources such as Spotify, but which can extend the CD or DAB+ radio sources from the micro system throughout the home.

The \$799 SC-PMX100 micro system (bottom right) includes CD, DAB+ radio, DLNA and Bluetooth streaming with NFC connection, USB playback from sticks or hard drives, and an auxliary input — all of which

can be re-streamed to other AllPlay units on the network. High-res FLAC and WAV files are supported via USB playback up to 24-bit/192kHz. The Qualcomm-based AllPlay app can then add online content including Spotify, AllPlay Radio powered by TuneIn, and Aupeo! (some of which operate outside the main AllPlay app itself). The inclusion of CD and radio in the SC-PMX100 has also fortuitously forced Panasonic to layer its own requirements over Qualcomm's AllPlay app which, as readers of our previous issue will know, was considered a weakness of Panasonic's multiroom system compared with the excellent audio quality we experienced from both the SH-ALL8 and SH-ALL3 speaker units.

Less information is yet available on the stylish SC-ALL5CD radio player (centre right) and the upright SC-ALL2 (top); there is also an AllPlay-equipped soundbar is Panasonic's flagship model, the SC-ALL70T. It can be paired with the small new SC-ALL2 speakers to create a 5.1-channel surround system. More info: www.panasonic.com.au

New ways to AllPlay:

- the SC-ALL2 upright speaker (right),
- the SC-ALL5CD radio, due for release in July,
- and the SC-PMX100, the first micro system to benefit from multiroom compatibility.



4K BLU-RAY SPECS RELEASED

IFA in Berlin this September is shaping up to be the launch venue for 4K Blu-ray players and discs, now that the Blu-ray Disc Association (BDA) has finalised the official specification and plans to begin licensing of Ultra HD Blu-ray. The industry association has been under pressure to speed the release of a physical Ultra HD format given the increasing lead of streaming services in providing 4K content.

With few surprises in the final specification compared with the preliminary spec issued six months ago, companies planning an early release should be able to press ahead with their mildly optimistic plans to get players in the market by Christmas. Panasonic had a prototype 4K player on show back at CES in January, and seems in pole position to have a working production player to announce at IFA in Berlin.

Pioneer, Samsung, Sharp, Sony and Toshiba are also members of the BDA, so are well-placed to bring players to market, Sony especially so, given that the day job of Victor Matsuda, chair of the committee which announced the new format, is as VP of Blu-ray for Sony America.

4K movie material

The most complex task remaining may be the development of robust authoring tools for the software. BDA members also include Twentieth Century Fox, Universal Studios, The Walt Disney Studios and Warner Bros. Entertainment, so the software market should be well-primed to get 4K discs on the market, especially since Hollywood has been remastering classics in 4K for years. Interestingly it may be recent blockbuster SFX-laden movies which won't appear in genuine 4K, since their effects are often rendered in 2K to save processing time, while most early original digital 4K footage was never retained because of digital storage costs (see also p24).

Full animation movies can always be re-rendered at higher resolution if the studios deem the process worth the value of revisiting.

Time for a new player

You will, of course, require a new player to play these new discs. The format includes 3840 x 2160 pixel resolution at up to 60 frames per second, plus High Dynamic Range capability and wider colour gamuts. Subjective tests on Ultra HD by the 4EVER Consortium in France have demonstrated that higher frame rates, deep colour, and High Dynamic Range can achieve more perceivable improvements in quality than 4K resolution itself (see p23-25). The discs will also be able to carry the latest object-based audio formats such as Dolby Atmos and DTS:X.

The players are promised to be entirely back-compatible with existing Blu-ray discs, says the BDA.

Early reports suggest that the penalty for early adoption may not be as painful as in the past, with players expected to be around three times current pricing for 2K players, so potentially under or around \$1000 at launch, and given the speed of the market today, prices will settle quickly. The discs themselves are hoped to be no more expensive than current premium 3D discs, around \$35 per title. It seems that current Blu-ray region coding will remain in place, so that Australia may continue to experience the usual delays in release dates for local titles, potentially also affecting hardware release times for our market.

Beyond Blu-ray

An interesting note in the official release concerned the optional provision of a "Digital Bridge feature", with the idea that purchase of the Blu-ray can enable the consumer to view their content across a range of in-home and mobile devices. Whether this involves an extension of the current 'Digital Copy' system or closer ties with cloud services such as UltraViolet is as yet unclear. But it shows a realisation that release of a physical format alone may not be enough to survive in markets such as Europe, where the disc market is suffering severe reductions in retail placement.



ABOVE: Focal's Soprano no.2 speakers ['soprano', geddit?], one of two new Soprano models previewed at the recent High End show in Munich. Focal claims it incorporates the company's "best midrange driver ever", using new Neural Inductance Circuit technology for magnetic stabilisation, and Tuned Mass Damping to remove resonance peaks. Interestingly the main drivers use the company's 'W' glass sandwich (double V for 'verre'), not the newer Flax drivers. The Soprano no.2 is expected in Australia in August, priced around A\$25,000. More info: www.nadist.com.au

RIGHT: The Astell&Kern brand from iRiver has released the AK Jr high-res audio portable at just \$699, using a single Wolfson WM8740 DAC and including 64GB of internal memory and a microSD card slot. More info: www.busisoft.com.au



NEW MUSIC SERVICE

While we await the effects of 'Apple Music' streaming, a unique Australian-based online platform is due to launch as early as the end of June, offering CD-quality and potentially higher resolution music downloads, but also an innovative live performance recording platform.

OpenLIVE has announced a partnership with 7digital (nothing to do with the Australian TV channel, rather the Europe-based digital music platform and content management service) to power the Australian start-up's new music store.

"We strongly feel music is an art to be valued rather than commoditised; that music should be appreciated and experienced, not merely exist in the background," says Dale Moore, OpenLIVE's CEO (and formerly of Yamaha Music Australia — the company's Audio Technology Director Simon Tait is also ex-Yamaha).

But beyond the shop-front of downloadable tunes in full resolution, OpenLIVE has an interesting focus on providing 24-bit/48kHz recordings of live performances from venues around Australia and potentially the world. It has developed a suite of technologies under the name MasterBuilder, which includes proprietary networked hardware permanently installed alongside any venue's sound reinforcement system. Upon request from an artist, MasterBuilder collects high-quality sound recordings and delivers them straight after the concert to the Artist's 'dashboard', where they can select any sections they wish for release through OpenLIVE's store or other digital music retailers. In this way, OpenLIVE aims to unlock new opportunities for artists, signed or independent, to collect high-quality recordings of their live performances and monetise them with ease.

"What we have developed opens up a whole new way for bands



and artists, big and small, to capture, critique, chronicle and monetise their live performances," says Simon Tait. "Nothing like this exists; the complex tasks of capturing, editing, preparing and releasing a live recording have been boiled down to a dead-simple five minute job."

OpenLIVE's website is already available and will update with its full consumer services at the end of June 2015. Plans are also in place to expand the service to the UK and US markets late in 2015. For more info and early sign-up, visit www.openlive.com.au

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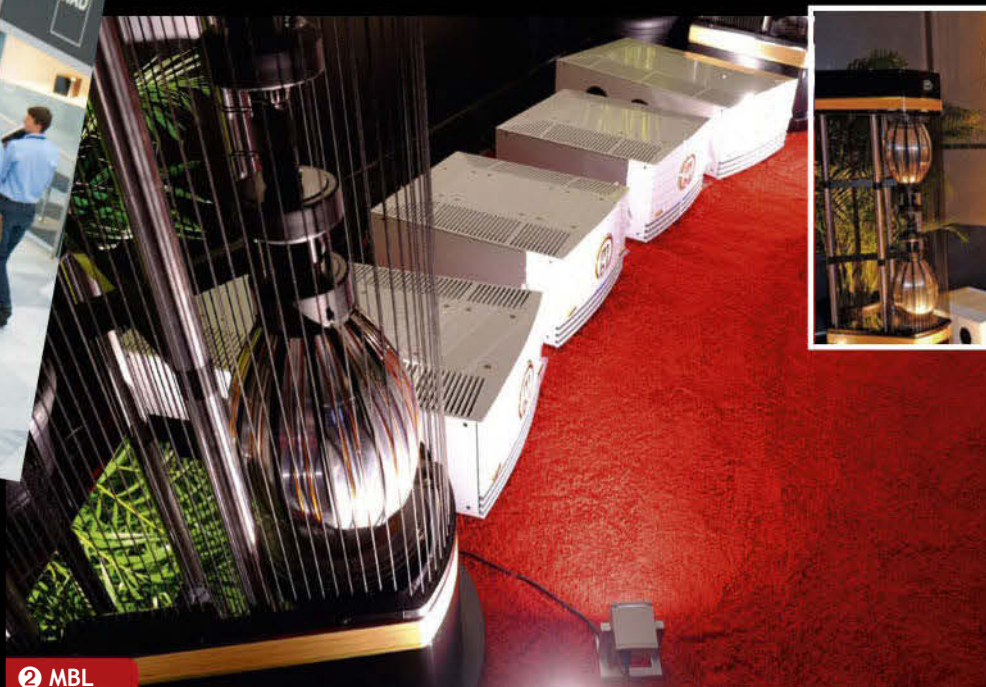
Living the High Life

The city of Munich hosts what is now the undisputed high-end audio show of the year. Our man in Bavaria picks 10 standout rooms from High End 2015.



1 The Living Voice

Now established as the unrivalled annual feast of high-end audio, the High End Munich show venue delivers surprisingly decent room acoustics for the oceans of high-end exotica that came to this German city from all corners of the globe. Here we've picked just 10 of the most outstanding displays, all shining sonically given show conditions, while also impressing with wise system choices, skilled room set-up and music choice. These rooms also proved popular with the punters — an educated audience — sometimes making photography a challenge for us, as did a curious correlation between ascending system cost and descending illumination levels. Let's get picking... *Edgar Kramer*



2 MBL



1. What do you get when you combine top-line Kondo, a massive battery power supply and the full Living Voice Vox Olympian horn system? The top sound of the show... a totally effortless presentation with scary dynamics and detail that presented familiar music in a new and fresh way.



3 Stenheim / CH-Precision / ZenSati

2. Germany's own MBL presented its Xtreme system, which has wowed the global show circuit globally – as it did here, with a massive soundfield that brought orchestras into the room (or transported you there). And what design!

3. The Stenheim flagships sounded majestic with CH-Precision electronics and the magic of ZenSati cables. ZenSati's Mark Johansen's dance track had dynamics and bass to die for.

4. Thrax featured the new Teres amplifiers and Lyra speakers; also on debut was the Helix 1 turntable from Mark Döhmman. The system sounded tonally accurate and head-spinningly powerful. Döhmman played the track of the show, Mad Season's 'Artificial Red'. Just wow!



4 Thrax



5. The all-Nagra system featuring the new HD monobloc amplifiers effortlessly drove the Wilson Audio Alexia speakers, encouraging such attendance in this room that it was a struggle to get in throughout the entire show to enjoy the excellent sound with an ease and top/bottom extension that presented classical to Led Zep... naturally.
6. Crystal/Siltech exhibited the new Mini Saga integrated in its almost final form (minor cosmetic changes) driving the Crystal Minissimo diamond-tweetered speakers and a yet-to-be-named subwoofer. The Minissimos punch well above their weight but in conjunction with the subwoofer the sound stepped up to another level of power, involvement and bass shock. Marvellous.
7. Wilson Benesch debuted the R1 Reference rack with a system of CH-Precision electronics, the Air Force Two turntable from highly-acclaimed TechDAS and WB's own Endeavour reference monitor. The sound was solid yet smooth, refined, and tonally beautiful.
8. The highly-anticipated Magico S7 was shown for the first time in Munich with Constellation Audio electronics. The gorgeous blue gloss samples delivered some of the best bass at the show, providing stunningly delicate micro-detail and massive soundfield.
9. Absolare provided valve electronics and Kodo TT, while Rockport's Avior was the transducer of choice. Digital sources were from high-end server 'The Beast' and MSB DAC. We've been impressed by the Aviors' sound before, and in the system context here, they continued to provide a smooth, detailed, dynamic and big-scaled sound.
10. Gauder Akustik's Berliner RC9 speakers in gloss white were shown with AVM electronics in tandem. The system, with music sourced from AVM's new Evolution MP 5.2 media player, had a present and palpable midrange, a smooth top-end and deep and tight bass.

CLOSING COMMENTS: There were many other rooms that sounded rather good — including Vitus, Kaiser Acoustics, Kharma, Cessarro, Tune Audio and more. This was this writer's first visit to what has become the biggest high-end audio show, and it was a revelation. It's well organised — this is Germany, right? — and the MOC is a superb venue. No small and dark hotel rooms here — spacious and well-lit rooms (mostly) are on the Munich menu. And the who's who of the audio world is there under the one, massive, roof. As the Germans say: super cool!



5 Nagra



6 Crystal/Siltech



7 Wilson Benesch



8 Magico



9 Absolare



10 Gauder



7 Wilson Benesch



the sound of craftsmanship

The art of AV Receivers

With WiFi and Bluetooth connectivity, the NR1605 AV Receiver lets you enjoy all your digital files - wherever they are. And with 4k Ultra-HD you get breath-taking pictures, razor-sharp lines. And for those preferring a more bolder design, the same goes for the SR5009, the SR6009 and SR7009. Enjoy!



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Topfield TF-T6211HDPVR Smart PVR with Android OS 4.2

Topfield's Android Smart PVR is made for sharing. Loaded with full PVR abilities as a twin-tuner TV recorder with 500GB hard-drive, the TF-T6211HDPVR can also share those recordings (or a live TV stream) with multiple smartphones or tablets on your home network.

In the other direction you can stream content from your smartphone or tablet to the Topfield and watch it large on your TV.

As for content, the Android platform allows downloading of hundreds of apps for catch-up TV, video, music, social media, games and more.

- Enjoy smart TV – even if you don't have a smart TV!
- Twin-tuner 500GB PVR (record two channels, watch a third)
- Watch from your smartphone or tablet
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From 4K to real 'UHD'



We're moving from mere pixel-number marketing of 4K to a genuinely different video experience — something truly worthy of the name 'Ultra High Definition', says Paul Gray of DisplaySearch/IHS.



High Dynamic Range offers potentially enormous gains in brightness, but so far there's inadequate perceptual research and a lack of standardisation, says Paul Gray.



Paul Gray of DisplaySearch (now part of IHS) delivered another fascinating keynote at the IFA 2015 Global Press Conference. One highlight was his interpretation of subjective tests on Ultra HD by the 4EVER Consortium in France, which he described as “really excellent research” into the perceivable improvements delivered by higher resolution, higher frame rates, deep colour, and High Dynamic Range. The following is taken straight from his speech, the panels are from conversations after his address, and the slides featured are copyright IHS.

Beyond pixel counts

Last year when I talked about 4K there were a lot of issues that it was a numbers marketing play, and that pixel count is like love — you can't get enough of it.

What I'm going to portray now is how 4K is beginning to develop away from just throwing extra pixels in, to doing something that I would actually call 'UHD' — that is, you offer a completely different video experience rather than just throwing pixels at it, something which is completely different from just conventional HD.

If you look where we are at the moment, we have no problems on the TV side — UHD/4K TV shipments are

absolutely surging, and TV brands have come very quickly to offer things like deep colour, and now we're beginning to see some things on High Dynamic Range. However this is still in advance of any standardisation, and research on consumers and human perception is very important in building something that will really work, and that people will see as being really different and better compared with conventional HD.

UHD couldn't have happened in the current products without streaming services, and the investments in connected TV over the past five years have really been an enabler. That connected TV investment looked very visionary five or six years ago, but it has really underpinned what's going on now, and we can see that streaming services are filling the gap.

However they're very genre-specific, whereas conventional terrestrial and satellite cable broadcasters are focusing on absolute image quality rather than speed to market. And they also deal their money around much more in other content genres.

Finally on the disc side, of course, we're still awaiting a UHD Blu-ray disc, and indeed products. But at the same time especially in Europe the disc retail business is collapsing. There was

4K in the can?

“People have been shooting in 4K for a while for TV, but there’s a bit of a misconception about Hollywood. Hollywood has used 4K cameras for 15, 20 years, because they wanted the best quality source to edit from, then you can throw stuff away and you won’t degrade the end result. But Hollywood didn’t actually keep those masters — the cost of storing data then was immense, and they’re like ‘Ah, we’re never going to use it’.

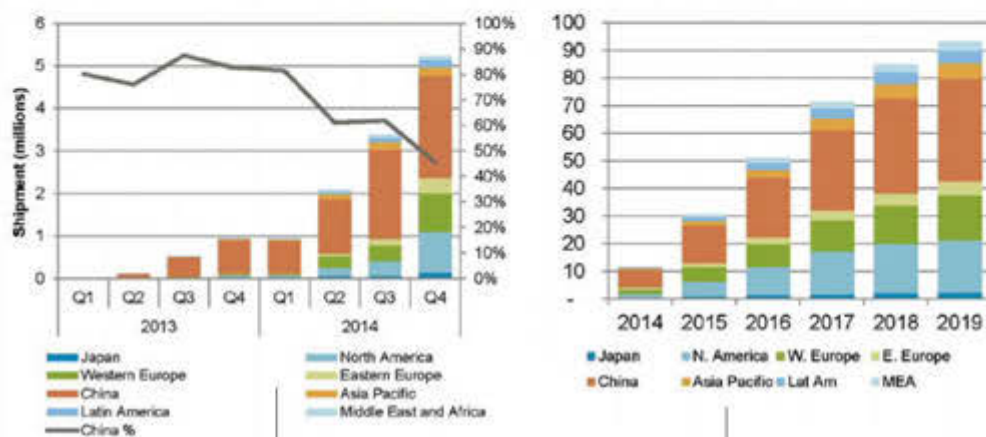
“So broadcasters are looking like the visionary ones — they have been working for five plus years, and all those top-drawer dramas, nature programmes, documentaries have been shot in 4K to build up a library. Of course the issue is not about having one programme a week, it’s about being able to launch and do six hours of coverage or whatever a day. So that war chest has been built up...”

4K versus 8K

“The broadcasters had a view — not all of them, but certainly BBC and NHK — the problem with 4K was that yes it was an improvement in resolution, but it wasn’t a massive step forward. They said let’s not do half steps — they’re thinking on a generational basis so you do a new TV standard every 30 years. And if you looked at 2025 which was the sort of time that they were thinking about for UHD, then 8K made sense, they said you look at the trend on Moore’s Law and all these things and probably that would be feasible. Then what happened was that a whole load of panel makers made 4K panels and managed to sell them — they ‘escaped into the wild’, as I say. It’s the cock-up theory of history — people made them and they got adopted...”

4K smartphones

“UHD in smartphones is going to be as big as UHD in TV... We see tablets and smartphones of 700 pixels per inch this year, so 4K handheld devices we will see this year. And by 2021, 200 million UHD smartphones and tablets are likely to ship. And what is interesting and nice for broadcasters is that all these things they’re doing in terms of enhancement — in deep colour, High Dynamic Range — they work just as well in smartphones, in fact they are much more noticeable. So you may not have to worry about the resolution of your phone screen, but you will see that deep colour, that HDR regardless of screen size, and it will be instantly noticeable.



4K SHIPMENTS 'SURGING'

China continues to take the lion's share of 4K TVs, but its share is falling as other regions catch up. And China still markets 4K on 'numbers', says Paul Gray.

Chart © IHD 2015.

FIVE-YEAR FORECAST

4K screen sales are set to triple over the next five years, topping 90m units in 2019, driven by growth in every region of the globe.

Chart © IHD 2015.

an announcement a couple of weeks ago from a couple of studios that will no longer be actively marketing discs in Europe, and finding any kind of disc from a content catalogue is getting pretty hard these days. And the traditional value proposition of discs — that you can buy it and watch it immediately — is really vanishing, so I have got a concern about discs really. Regardless of what happens on UHD and Blu-ray, the retail channels are drying up and typically the only place you find Blu-rays for sale, or DVDs, is in the front of a supermarket, and there's maybe 20 or 30 from the latest catalogue.

4KTV strategies

So if we look at the shipment of 4K TVs, it's surging, there's no other word for it [see graphs above]. We're up about 550% year on year, and we're beginning to see that those shipments are balancing out, and that China's share is coming down every quarter as products are launched into other regions. I see this as being very healthy, and what you would expect. And seasonality is looking pretty normal. I'd say it is an unmitigated success at the moment — consumers identify with these products and they seem quite happy to pay extra money for them.

If we look at the forecast we see that the fall of China will stabilise and that China will still lead the 4K market throughout the forecast period, while other regions catch up. And this reflects the new reality that the Chinese consumer is, in general, the most early adopting in the world, and that China is in that virtuous circle of early adopting consumers having the technology base, and the market now where Chinese companies can test-launch products in their home market and learn from that, and spawn the successes out into other regions in the world.

However we still do see a difference in strategy — that in China it's just 4K and there's much more numbers marketing. For example there are sets in China that have 4K panels but don't have HEVC decoders, whereas everywhere else in the world, if it has a 4K panel it has an HEVC decoder. So there remains this disconnect of content being linked to products everywhere, apart from in China where products are still sold just on more pixels.

And the other thing to note is that Japanese set makers are extremely aggressive in launching 4K across their ranges, so their general strategic shift towards the high-end means that most of their ranges are now 4K. If you look in Japan at retailing, it's hard to believe that you can buy 1080p sets in Akihabara — there's a dimly-lit corner where you can buy 1080p sets but it's really hard to find that, while these beautifully demonstrated very large sets are everywhere in the retail store. There are little stools to sit down on where the salesman can get at you and explain it — there's real effort and care taken in that retailing, and this is a best practice that we'll hopefully see in other regions as well. 4K is about numbers marketing, but UHD is about the experience, and here they're retailing that experience. Note also how close those stools are to the screen.

Beyond resolution

There are some interesting results on subjective tests on different things for genuine Ultra HD. Most of this information comes from the 4EVER project in France, to whom I'm extremely grateful, excellent research. And number one



No Olympics in Ultra HD – “better to wait and do it well...”

“It’s pragmatic, the Olympics not being in 4K – it’s better to wait and do it well than rush and do it badly. Talking to people like Sky they’re spending a huge amount of time, money and effort on understanding what works and how to shoot riveting 4K content for sport, led by Sky Deutschland – so that first time you see it you’re going to go ‘Wow’.

And if it doesn’t have ‘wow’, if it says ‘We’re going to have a light on the set-top box that tells you when you’re watching 4K...’, then you know, you’re missing something!

“The thing that really frightens them at the moment is lenses. You expect everything sharp, and you can see if it’s defocused, if the cameraman hasn’t done a good job. In Hollywood

you have a focus puller, of course, and you can practise, but for live sports you can’t do that. One of the things Sky said to me was that the level of training for their camera crews had to be very high. The poor guy behind the camera only has a tiny screen...

So there are big problems for them in terms of shooting really good content, and it’s not trivial to solve.”

point here is that resolution doesn’t have a ‘wow’ effect. Yes, UHD is visibly better, but you have to sit awfully close — about 1.5 times screen height. That’s how you ought to be looking at those screens to get the benefit of the resolution — so for an 84-inch TV you want to sit 1.6 metres away [157cm, to be precise... Ed]. It’s a joke I’ve heard that in Hong Kong nobody needs a remote control because they have to sit so close to the screen. [Audience laughs.] Well maybe the rest of us don’t need remote controls either, if we’re going to watch with a normal sort of size UHD screen that we would consider in our houses. So this is one of the problems about resolution — you do need a very very big screen and you need to sit very close to see that benefit.

However, even at further distances there’s something about it that people can see, and it improves things like readability on characters, especially Asian fonts.

What 4EVER also found was that High Frame Rate was very noticeable. It does depend a lot on the content — clearly if you’ve got slow-moving content then you won’t see it as much. But it’s critical for sports, and some of the 120Hz content that I’ve seen, you can suddenly work out what’s going to happen next — you can see what part of the bat the ball is hitting, or what part of the racket; you can see what part of the footballer’s boot the ball is going to touch and you can estimate where the ball is going to go next. So it’s really part of that storytelling for sport, and it’s very exciting for sports broadcasters, and they’re very interested in doing that, they really insist on it.

High Dynamic Range again is also extremely noticeable, and as that peak luminance goes up, then consumers visibly perceive an improvement to picture performance.

However, we all know what it’s like watching TV with deafeningly loud audio in commercials, and one thing I would say is just imagine what it’s

going to be like watching soap powder commercials when you’ve got a high dynamic range TV — you know they’re going to want to turn the brightness up to 11, and you’ll have to put your sunglasses on... So there is an area where brightness becomes too high and it’s actually painful to look at.

So at the moment broadcasters are working out what sort of brightness steps and levels, how you do those brightness staircases, what is perceivable, and there’s a lot of research and standardisation work that is necessary.

And finally deep colour, yes, definitely very noticeable if the content is right, and if the content is shot well, and I think for things like wildlife photography and cinema then deep colour has real value and people can see the difference.

So underpinning that deep colour, then, we’ve got a forecast on quantum dots — this is the fundamental technology behind deep colour at the moment, although I wouldn’t want to bet against people investing in improving conventional LED technologies as well.

The other thing I would say on deep colour is that it’s also extremely valuable in tablets and smartphones and PCs for e-commerce. We’ve all had that experience where you try and buy clothing on the internet, and what it looks like on the screen compared to what it looks like in real life is very different, and what’s worse is you have no idea about where that difference lies. So for reliable e-commerce I think we will see these very faithful displays that use quantum dot or other enhanced deep colour technologies coming into play. So quantum dots and these things work all the way across screen sizes.

One of the things that’s interested me as an analyst is that I’ve met these mysterious animals called ‘directors of photography’ — and they speak a completely different language to me. What is very clear is that we’re now reaching a point in broadcasting and

television and video products where the genre of what you are watching has a great effect on the visibility of different technologies, and that different technologies work for different genres of content. This is very different from where we were before, where we were just trying to trudge uphill as an industry and make things better. We’re now at the point where you have some things which are specific for different genres.

A lot of this stuff Hollywood has known for a century or so — for example Hollywood knows about motion blur; they’ve been dealing with 24 frames per second for more than 100 years, and they shoot action sequences with very short depths of field to take away the blurred background and just defocus it, and it allows you as a creative to then guide the viewer onto the action, because that’s the only bit that’s sharp.

Live sports isn’t like that, because no one knows what’s going to happen next. So the demands on the technology for live sports are very much higher, and everything has to be sharp. So in football you want to see where all the other players are and which direction they’re running in so you can anticipate what’s going to happen next — you want that sense of presence of everybody in the stadium being sharp. So this is very different to Hollywood.

I think this explains a lot of the reasons why broadcasters have seemingly been slow — their technical problems are far worse than Hollywood, who can creatively shoot around them. And indeed that also comes to things like Netflix delivering movies, where they actually have a lot less data because a lot of things are deliberately blurred, or they can creatively work on it, and they can compress multiple passes instead of in real time.

So broadcasters have some nasty problems to solve. And one of the biggest is the huge amount of data, because you have multiple camera feeds and you have to move this data in real time. However one of the things they do know is that with UHD you can process and handle outside broadcasts simultaneous to HD, so it’s not like 3D.

Paul Gray is Principal Analyst/Researcher with DisplaySearch/IHS: www.displaysearch.com

Showrooms and the Art of Demonstration



Buying hi-fi without listening to it is like buying art without seeing it. Hi-fi stores are happy to help.



ROUNDTABLE PARTICIPANTS

We thank all those who participated in this Sound+Image roundtable:

FROM NEW SOUTH WALES

John Cornell, AUDIO JUNCTION
Nick Papas, AUDIO SOLUTIONS
James White, HARVEY NORMAN
COMMERCIAL NSW
Len Wallis, LEN WALLIS AUDIO
David Moseley, WAVETRAIN CINEMAS

FROM QUEENSLAND

Matt Manalis, DIGITAL RESIDENCE

FROM VICTORIA

Geoff Haynes, TIVOLI HI-FI
Kairu Chan, THE SKY LOUNGE
Lalor McMahon, KLAPP AV

FROM WESTERN AUSTRALIA

Mark Jeisman, SURROUND SOUNDS

It seems such an easy question to answer — why should you listen to a hi-fi product before you buy? Many of our readers will be raising their eyebrows and thinking ‘Why on earth would you not listen to a hi-fi product before you buy?’ Yet so many people don’t. In an age where internet purchases are rising and the presence of bricks-and-mortar hi-fi stores in the High Street is declining, purchasers are selecting on the basis of forum chatter, specifications and random reports. With the rise of Kickstarter and other funding platforms, many are even buying a product before it even exists.

The reasons are manifold. With fewer hi-fi shops around, it may be harder to audition a specific component in which you’re interested; a combination of different brands may be even harder. Many have a nervousness of asking for an audition, fearing sales pressure, or feeling they’re then ‘tied’ into making a purchase. Others may not even know that such listening facilities exist — for a generation raised on chain stores and the internet, the idea of having a private hour or

two being personally served by attentive staff keen to help you make the right selection goes against the social sharing surges that sell particular brands. People may even think they will embarrass themselves by not being able to tell the difference between one piece of hi-fi and another.

So here at *Sound+Image*, we thought we’d encourage a return to proper auditioning through hi-fi and home cinema retailers who are keen to prove the quality of their advice, their merchandise, and their in-store and after-sales service.

Because like we said, why *wouldn’t* you listen before you buy? Without hearing an audio system for yourself, you are essentially buying a pig in a poke. Get a demonstration. It makes sense.

To reinforce the point and clarify the issues, we’ve discussed the merits of demonstration with some of Australia’s best hi-fi and home cinema dealers. Their approaches can be different, but they all believe one thing is true — you should most certainly try before you buy.

Q: So why should you try before you buy?

This most basic of questions brought the simplest of answers from our panel of hi-fi retailers, who were largely mystified as to why anyone would ever rush to buy a product that they presumably hope to live with for many years before listening to it.

LEN WALLIS (Len Wallis Audio): To me, buying any audio component without hearing it first is like buying art without seeing it. It fascinates me that people can buy gear without an audition, yet we do now see this on a regular basis.

GEOFF HAYNES (Tivoli Hi-Fi): Think about the importance of buying the right hi-fi. With the exception of products that are on passively in the background, like a fridge, there is no product in most people’s life that is used more regularly than a hi-fi or home entertainment system. So choose wisely.

NICK PAPAS (Audio Solutions): Some people are prepared to buy some things online, but I think most people still like to come into a store and talk to professionals and listen to things, so they can see and hear for themselves what they are buying.

LALOR MCMAHON (Klapp AV): Try before you buy should be part of everyone’s purchasing process. You wouldn’t buy a car without testing it out and you shouldn’t purchase speakers without listening to them first. How can customers make a decision without a demonstration? It’s a very important tool when deciding on something that is going to be with you for an extended part of your life. After experiencing the features and quality of the products demoed, the customer can make the right decision based on what they have seen and heard — knowing they’ll be happy in terms of the performance of the product.

MARK JEISMAN (Surround Sounds): Demonstration offers a reassured situation where the investment they are making is guided, correct and delivers what or more than they expected. Despite reading all the reviews you like, googling a pair of \$5000 speakers or a \$10,000 video projector isn’t going to tell you how they sound or how it looks. Buying sight unseen or unheard is fraught with potential disappointment and often misguided advice. Demonstration gives

The Sky Lounge, Melbourne

This is “a high-end location and environment to demonstrate high-end products”, says Kairu Chan, owner and operator of this hi-fi dealership with a difference. The Sky Lounge gained its name from its position on the 21st floor of an iconic building with beautiful city views across Melbourne’s CBD, and its facilities are booked strictly by appointment only. There is “a bit of a qualifying process”, given that the operators intend the demonstration room to be used only four or five times a month, the aim being to offer “a real chance to hear and experience the gear in an isolated environment — Melbourne’s highest and most exclusive hi-fi experience”. Website: www.theskylounge.com.au

Welcome to the world of real hi-fi and home entertainment!

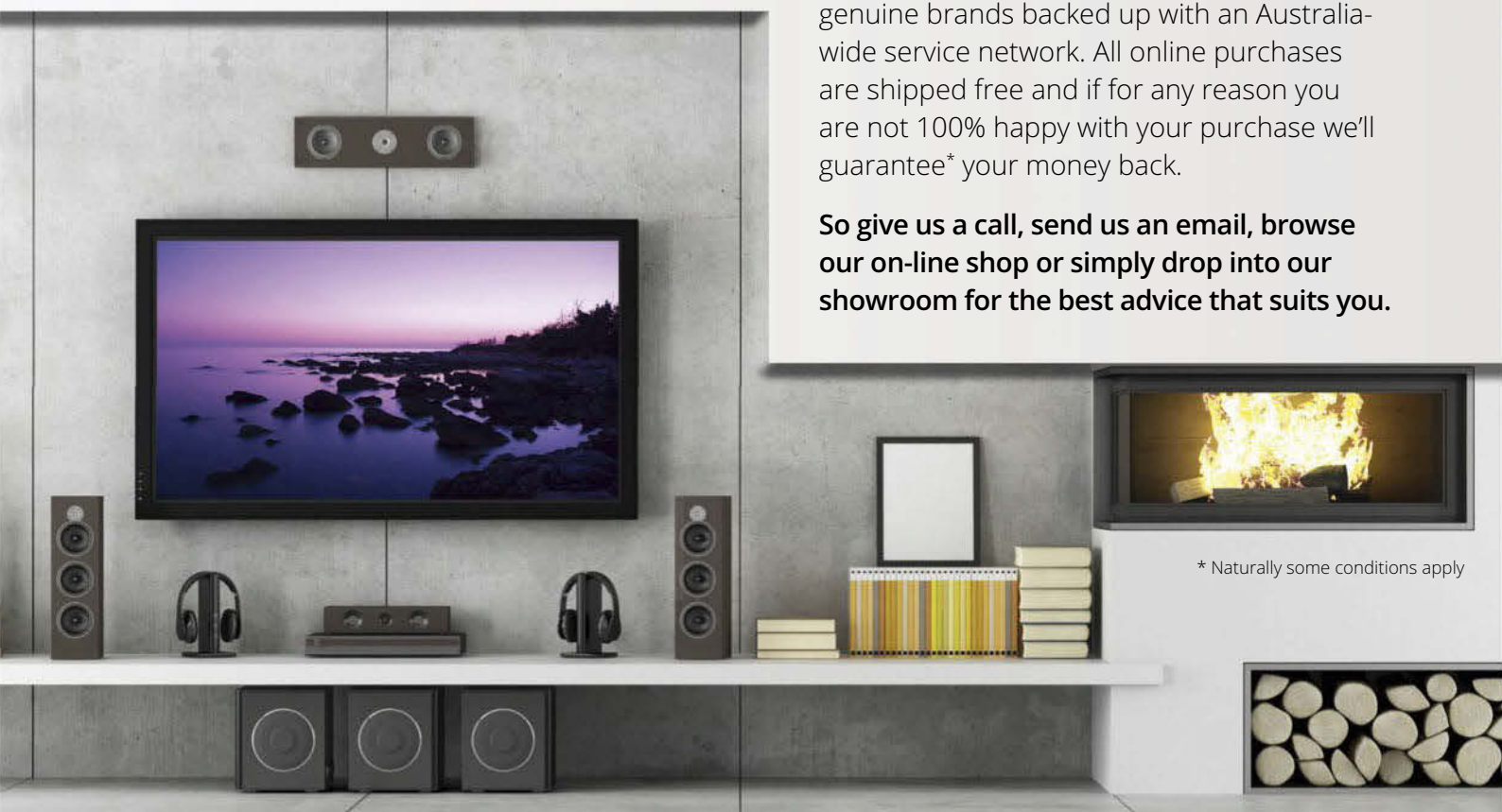
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Individual tastes differ so when choosing a hi-fi or home entertainment system it's nice to know that our staff at Audio Junction are experienced, knowledgeable and friendly. Ask a question and get a straight and qualified answer, to help make the experience of purchasing a home entertainment system enjoyable and stress free.

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At our Newcastle showroom you can see, touch and listen to the latest in audio and visual treats. But wherever you are, you can enjoy with total confidence the Audio Junction experience by shopping online 24/7. Yes, safe in the knowledge that all our products are genuine brands backed up with an Australia-wide service network. All online purchases are shipped free and if for any reason you are not 100% happy with your purchase we'll guarantee* your money back.

So give us a call, send us an email, browse our on-line shop or simply drop into our showroom for the best advice that suits you.



* Naturally some conditions apply



B&W Bowers & Wilkins

marantz

Cambridge Audio



the customer a sense of reassurance, emotion and excitement that draws the client to making the right choice that suits them.

KAIRU CHAN (Sky Lounge): It's a chance to really hear and experience the gear in an isolated environment — something which you usually can't do in a retail store. The Sky Lounge is dedicated to high-end audio and is permanently set-up as an appointment-only demo location. At this price point no-one buys without a demonstration.

MATT MANALIS (Digital Residence): You can't sell hi-fi equipment without demonstrating it, well at least not at this level. No one pays thousands of dollars without hearing what they are buying first. Not only that, it allows the customer to hear the differences and actually buy what they like — not what someone is trying to sell them, or what they've been 'told' to buy.

Q: How do you find the right 'level'?

Several of our panel pointed out how useful a demonstration can be in helping people discover the level of sound they want, and so how much they really want to spend. With expert advice on hand, this can, as John Cornell notes, save the buyer money.

JOHN CORNELL (Audio Junction): If the demonstration is carried out well with good demo material and a lot of input from a knowledgeable salesperson, you get the

opportunity to show the potential client that you don't always have to spend a huge amount to get something that outperforms a system from one of the merchandisers.

NICK PAPAS (Audio Solutions): If a customer tells us they're not happy with a certain aspect of their system, we aren't always going to take their money and change their speakers. Little tweaks can often times be easier and more cost effective, getting an existing system to perform at its best.

LEN WALLIS: Something that we have seen regularly is that most people don't really know the value of what they are looking for. The most accessible marketing media is of no help in this situation. No one pushing a \$149 Bluetooth speaker in the press is going to admit that the sound is pretty crap, and price points are being constantly driven down by the box-movers, who really have the marketing clout. You will only learn this through a well-structured demo. It is not uncommon for someone to come in with a set budget, only to find that their expectations are not met at that price point, and assuming that they have the available funds, they are happy to re-set that budget accordingly.

JOHN CORNELL: A good quality demonstration can sometimes mean the difference between a client spending peanuts on a cheap system and purchasing a long-lasting value-for-money system that has been carefully selected by a knowledgeable staff member.

LEN WALLIS: A proprietor of a very successful chain, many years ago, once said that the motor car industry does itself a huge

disservice by not ensuring that every member of the public gets to drive a sports car. This industry is no different.

GEOFF HAYNES (Tivoli Hi-Fi): Sales people ask a customer how much they want to spend, but often people wouldn't have the foggiest — mostly they haven't been exposed to what is on the market or why they should spend more. At Tivoli Hi-Fi we invite our customers to hear something better than they may have imagined owning, so they can have an experience. Budgets are all about priority. People spend a lot of money on cars because they can test drive them and compare them to something better. They then 'find the money this time', or the next, because they shift their priorities. Purchasing a hi-fi is no different. In the scheme of things buying a \$2000 amplifier and buying a \$4000 amplifier is mostly a shifting of focus, and you'll never know if the difference isn't demonstrated.

Q: Can you trust the 'expert advice'?

On one level, hi-fi stores are, of course, hoping you'll buy some hi-fi. But they are also invariably staffed by audio enthusiasts who aim to make you a longterm customer by offering advice that will help you buy the right system for your needs.

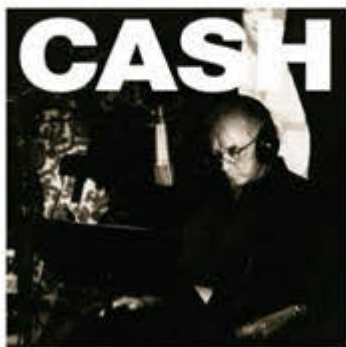
MARK JEISMAN (Surround Sounds): It's important to our credibility that we are guiding the client with the right choice, so often we'll ask them to consider other options



Tivoli Hi-Fi, Melbourne

"We understand that music is a journey both financially and in appreciation, like wine," says Geoff Haynes from Tivoli Hi-Fi in Hawthorn East. The store thus stocks products across a range of price points, with seven different listening/demonstration rooms, from a budget room with 'off-the-shelf' systems to two audiophile listening rooms, plus two different styles of home theatre, a 'German television gallery', and lastly a headphone listening booth with portable music players and computer music.

Website: www.tivolihifi.com



The right tunes...

Taking your own music is highly recommended, but we also asked our panel to offer some demonstration favourites of their own.

1 LEN WALLIS: "One favourite is Johnny Cash's *American V* — recorded just before his death. His voice is totally shot, the recording is fabulous in its simplicity, but it is the best example of emotion in music that I know of. I am a believer that any good system should be able to portray emotion, and this is a good disc to test that with.

"Another is Nigel Westlake's 'Requiem for Eli'. The recording of percussion on track six is excellent. Pat Metheny's 'What's It All About' is also an excellent recording — particularly the first track, but it might be a bit laidback for some.

"Like a lot of people we use Shelby Lynne's 'Just A Little Loving' a lot — tracks two and three are very good. And Arcadi Volodos's 'Piano Transcriptions' — the Liszt 'Hungarian Rhapsody No. 2' is excellent."

2 JOHN CORNELL (Audio Junction):

The latest is 'Lordy May' from Boy and Bear, and 'Romeo and Juliet' by Lisa Mitchell.

in addition to the one they came in for. They are coming not only for equipment, but for the right expertise from a specialist retailer that is living and breathing the stuff day in and day out.

NICK PAPAS (Audio Solutions): The one constant is that people value good customer service and advice — that's what has kept us in business. We help people get the right products at the right price — we want all of our customers to get the best value for money, and refer their friends.

LEN WALLIS: Many people are not even aware of what to expect. This is particularly true of younger listeners, many of whom have been brought up listening to MP3 with cheap earbuds. Once they are exposed through a demonstration it opens up a whole new world for them.

MARK JEISMAN (Surround Sounds): These days between Google or a mate, everyone seems to be an expert on something and well versed, often coming to almost give us the review on the gear before they've even demoed it. In many cases it is for a variety of reasons rather than the right choice to suit their needs. Our team is excellent at reading and listening to the client's needs and situation, so they can guide the client in the correct manner, despite in some cases a predisposition toward what they think they need.

NICK PAPAS: We have an old saying at Audio Solutions and it's simple — we would not sell any product to any client that we would not put in our own home. We're very quality driven, we don't put just

any product on the floor — as new products become available we continue to evaluate and determine if it's what we think will be a product that is here for the long run. Our clients can be guaranteed we are supplying products we believe in, and that we can support and service. This is where the experience and advice comes in.

Q: How should you prepare for a dem?

You could just walk in, but our panel suggests that a little forethought is likely to improve your initial product selection and shorten your visit.

MATT MANALIS (Digital Residence): Do some basic research about the products or models you are going to look at. Take along some demo content that you are familiar with, and ask as many questions as you can — nothing should ever be an issue.

MARK JEISMAN: My advice is be open minded, and for sure do your homework before you come but perhaps give due consideration to what is being suggested as it may just deliver a better result than what you came in for originally.

JOHN CORNELL (Audio Junction): It is always good to have done at least some research — preferably from reputable magazines! — to get a feel for what your budget may be. It is difficult for a sales person to recommend something if they have no idea of what a consumer is looking for.



Len Wallis Audio, Lane Cove, Sydney

"I can't think of anything that we won't demonstrate," says Len Wallis, who runs one of Sydney's most iconic and longest-standing hi-fi destinations. Len Wallis Audio boasts two-channel and surround comparator rooms, high-end two-channel and dedicated demo rooms, two further single-speaker demo rooms, a custom installation demo area, and a dedicated Bose/Loewe room... it also has a big secondhand department and a service division. Oh, and two coffee machines.

www.lenwallisaudio.com.au

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Tivoli Hi-Fi has one of the best ranges of products I've seen. With great knowledge and facilities, they're an example of why customers want to buy from a store and not online.
 - Heinz Lichtenegger, Founder of Pro-Ject Audio Systems



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www.tivolihiifi.com.au

The Experience... **only at Tivoli**

Audio Junction, Newcastle, NSW

"We always select our range of products on performance, value, reliability and back-up service, regardless of brand," says MD John Cornell of Audio Junction, which has been serving Newcastle and the Hunter Valley for 34 years. The store has four main demo areas — a 'Comparator Mid Fi' room, a 'Hard Wired Hi End' room, a Dolby Atmos Home Theatre demonstration room, and a dedicated Bose demonstration room, while the main store area hosts portable audio, wireless multiroom and soundbar demonstrations.

www.audiojunction.com.au



Q: Should you bring your own music?

Differences of opinion here. You might expect a big fat 'yes' — whatever you're likely to play on your new hi-fi, that's what you should audition it with. But dealers are keen for you to hear the equipment at its absolute best, so if your dealer also suggests tunes, give them a listen as well.

LEN WALLIS: Surprisingly few people bring their own music. I am always taken back when people mention that they did not bring their favourite music, but then ask for something obscure, like early renaissance choral music, or 10,000 Maniacs.

Customers bringing MP3 on their phones is becoming increasingly common. This is music that they enjoy, so it is important that we let them listen to what they have. However at some stage in the proceedings we would suggest moving on to something else, sometimes with surprising results. Recently we had this situation, and the suggestion was made to change the source to something CD based. The client was left alone in the room for a short time, and when the salesman returned he found the customer in tears — he had never heard music recreated in this way!

GEOFF HAYNES (Tivoli Hi-Fi): It is vital to hear good recordings in order to hear what the system is capable of. It is pointless test driving a sports car on an unsealed road — you want to see how it corners and cruises down a freeway. Think of your hi-fi test drive in the same way — give it quality

and it will reward you. But also ensure you are listening to something you are familiar with. Purchasing a hi-fi is not the time to experience your favourite band's new album — you need to hear their greatest hits.

MATT MANALIS (Digital Residence): I always try and use our own content first and if they do bring their own content then they can use it at the end of the demo.

LALOR MCMAHON (Klapp AV): Most people don't bring their own music — we prefer to demo our equipment with our software. To demo what the product can do is very important in my view. Of course customers are welcome to bring their own media for the demonstration — we stay with the customer so we can take them through the features of the systems and educate them at the same time.

MARK JEISMAN (Surround Sounds): We respectfully do both. On occasion people bring their own content, and that's cool. It's their reference point of comparison, so it makes sense to them. We'll always let them play it, leave them to it. But if it's badly recorded music, a good system will show that. That's when we step in and play something that would still interest them but from our selection. We prefer to play lossless files for clients as the ultimate, but we will also educate and demonstrate them across streamed and other technologies. It's important they understand when they get it home and they are streaming some internet radio station at 48kbps why it doesn't sound as flash.

JOHN CORNELL (Audio Junction): Very few people think to bring music, unless they

are looking to spend quite a chunk of money. We always encourage it, though, and we try to at least demonstrate some of our own tracks as well. We have a large library of music we have chosen stored at high bit-rate, and we make this available via iPad to customers — this way they choose music they're familiar with and feel relaxed and in control of their selection. This is another thing that is not available to them in a chain-store environment.

Q: Can you trust the 'expert advice'?

How do dealers prepare for a demo? We asked our panel to explain how important demos are for their business, and how they undertake them. Understanding your hi-fi dealer's point of view will help you get the best result from your listening time.

GEOFF HAYNES (Tivoli Hi-Fi): The demonstration is so important — we only have one chance to get it right. The first sounds the customer hears will make a lasting impression that they will carry through their decision-making process.

LEN WALLIS: There is a process. We lose sight of the fact that we do this day in and day out, but for many consumers this is their first listening session in this environment. They should be made aware of what to listen for — as long as it is relevant. The equipment should also be demonstrated in an environment which will allow the product to perform as intended — and that will not happen in the middle of a crowded showroom.



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audio research
HIGH DEFINITION

marantz

DENON

AVIDHIFI



The right tunes...

More personal demonstration favourites from our panel...

3 MARK JEISMAN (Surround Sounds):

"Perhaps surprisingly, I use a lot of albums recorded pre-2000. The reason for that is the dreaded loudness wars where in recent times due to iTunes, YouTube and radio, songs have been mastered 'too loud' where all the dynamic range of the sound has been compressed to the point of mush, rather than lush. I must admit though, Beck's latest album is a cracker!

"Having been in the industry since the early 1980s, I've been guilty of (and sorry about this) owning The Eagles 'Hotel California' off 'Hell Freezes Over', Arnie punching up the bar in 'Terminator 2' — and of course who can forget 'Brothers in Arms' by Dire Straits. I must owe Dire Straits some serious royalties with the amount of speakers I sold using that album.

"And demos should feature movie or music that is not offensive or uninteresting to the client — in terms of movies demos also be sensitive to cultural issues and age brackets. I've been into chain stores where Samuel L Jackson was doing his finest work in front of a bunch of preschoolers where Dad had plonked them down in the demo area..."

LALOR MCMAHON (Klapp AV): One of the key things is to make people feel comfortable. The demo room will more than likely be a different room size to their own home or installation space, so the sound can be different in store compared to home, and thus things like calibration need to be taken into account. This is something we pride ourselves on when working with the customer to ensure they get the best out of their system of choice.

JOHN CORNELL (Audio Junction):

I feel that if the potential purchase is a hi-fi system, then you should ask a lot of questions as to the type of music they are into, the type of environment it is going into. It is always important to make sure that you are demonstrating a product efficiently and not just entertaining the consumer with your latest fave rave music or movie, and boring the hell out of them.

GEOFF HAYNES (Tivoli Hi-Fi):

We employ a consultative approach to helping our customers — we take the time to ask at least four or five questions before showing or recommending a product. We're aware that a lot of our customers that are upgrading their hi-fi systems haven't been thinking about the industry for 10-odd years and so much has changed during that time. So before launching in to a demonstration of the latest iPad-controlled music system, we ask how they consume their music, whether they enjoy using CDs, whether they want to rip their music and if they've done so yet, or in fact they want something to help them do so. They may even want to play their vinyls. As solution-based sales people we guide them through these questions and options

with a minimum of tech talk in order to help them make a simpler decision.

JAMES WHITE (Harvey Norman Commercial):

A good demo shouldn't be too long, and should be a mixture of content whether it's music or movies being shown.

KAIRU CHAN (SKY LOUNGE): With high-end product you need somewhere like the Sky Lounge to show it off, a high-end location. And we have a specific type of client — people come here already trusting us, because they've found us by word of mouth. Most of our clients are not audiophiles... these are people who know how to press a button and play music, but they don't need to know how to hook them up, they don't want to go to hi-fi stores and become confused and overwhelmed. They want to speak to people they know, and that's the word of mouth thing that brings them to us.

From initial discussions, we work out what they're looking for, and then we get that set up for them to demo. We basically say that a demonstration is unlimited — spend as much time here and do whatever you want. But most would last two hours or so, on average. I stay for a few songs, answer some questions, make sure they know how to use the system, and then I just ask, 'Are you comfortable to handle it on your own?' and I leave them to it. And after their listening, then it often comes down to looks.

DAVID MOSELEY (Wavetrain Cinemas):

If we had a process for demonstration it would be to first find out what the client is hoping to achieve. Wavetrain certainly has selection material that we rely on for demonstration, but each demonstration is different.

Surround Sounds, Nedlands, WA

Surrounds' brand-new showroom is near-completion, featuring a dedicated Naim Audio room, a white Devialet room, two formal hi-fi lounge areas, McIntosh and Martin-Logan rooms, a Sonance custom speaker demo wall, a 'man cave' (with pool table, bar and commercial beer-keg system), a dedicated B&W hi-fi lounge, and a lifestyle area with Sonos, Bluesound, Tivoli, B&W. Plus home theatres which will include Cinema Delux 'Mk2' (the Mk 1 was our cover star back on Sound+Image July 2009)...

www.surroundsounds.com.au



PHOTO: RON TAN



Audio Solutions, Mascot, Sydney

"The vision was always to create a place where customers feel they're walking into a store that is owned by friends", says Nick Papas of Audio Solutions, located close to Sydney's airport. With three dedicated listening rooms, including Australia's first B&W Sound Studio, the store offers everything from headphones to high-end two-channel audio to full smart-home installations — and is also renowned for its barista-quality coffee!

www.audiosolutions.net.au

Q: Will the hi-fi store 'qualify' you before a demonstration?

All our panel members say that they ask qualifying questions in order to learn more about you, what you want and need. But if they think you're a time-waster, will they point you at the door?

LEN WALLIS: No. You never know what is going on under the surface. Given enough time, which is rare, we would like to demo gear to people who have not even asked, just for curiosity's sake.

DAVID MOSELEY: Wavetrain customers typically qualify themselves as avid movie goers looking for escapism through the story-telling of motion pictures. Most of our work is referral, as it's hard to explain to a client what we do. It's something they need to experience. Our industry-standard private cinemas are not for everyone, much like there is a plethora of cars available for different tastes.

NICK PAPAS (Audio Solutions): We pride ourselves on offering the same level of service to a customer spending \$30 on some ear buds as the customer looking for high-end hi-fi. This has allowed us to develop an incredibly diverse range of customers, from tradies to students to mums and dads.

MARK JEISMAN (Surround Sounds): We treat every customer the same when they come in, so they get the same experience as the next. We'd always show them our top-of-the-range theatre or two-channel hi-fi, for example — just to show what we can do or

what's possible. It's exciting and aspirational. Even if it's not for them, it builds enormous credibility, gets them talking around town and you never know one of their best friends may be in the market for something as well. That said we believe a good/better/best option is a great way to offer wider scope in the decision-making process. If you walked into a car dealership to buy a Toyota, but just for fun the salesperson offered to take you for a spin in a Ferrari, you wouldn't knock it back, right?

KAIRU CHAN: Because of the effort required to set up a specific demo and the time involved during the whole process, we have a bit of a "minimum spend" to make the venture worthwhile and it works out about \$10,000. So this obviously rules out a lot of gear that you won't find at Sky Lounge, which is why we stick to the high-end side of things. People find us by word of mouth or through the product — so they find Vivid or they find Devialet or Tenor or MSB. They'll enquire over email and it's important to qualify the client and make sure they're a real buyer.

JAMES WHITE: We try to get initial plans and as much information in advance of the demonstration appointment. In some cases, though, we have drop-ins who just want to have a quick overview of what we can offer. In those cases we are generally just giving guests a quick experience tour of our JBL Synthesis dream room.

GEOFF HAYNES: I find the most important aspect of hi-fi shopping is asking the questions, qualifying the customer. People entering the hi-fi shopping arena, be it online or in a shop, are met by a plethora of choices and flashing lights and a series of boxes which essentially are all the same size and shape but have vastly different price tags and uses. The job of a hi-fi salesperson is to help that

person to build a system that will fulfil their needs based on the priority for music in their life. There's no point investing money in a small mini system when the person wants to feel the cannons in the 1812. This is all part of the qualifying process and only works when the shop has an ability to demonstrate the products they are offering. If we start demonstrating products without having established the customer's needs first, we cause confusion and waste their time in coming to a specialist hi-fi retailer. Well-constructed questions will save the customer a lot of time and help them very much.

Q: What tips can you offer a customer?

MARK JEISMAN: Trust your own ears and eyes. Come in armed with a plan, explain your set-up, situation, how you use things, what you like, and importantly consider keeping an open mind — often there are many other factors, so that you may end up being recommended something other than what you had originally expected.

MATT MANALIS (Digital Residence): You should only ever buy from someone that is actually passionate about the product they are selling to you. Someone who is passionate will sell you the best products available, as well as making sure you are receiving the best products for you, and will spend the time with you to make sure you're 100% happy.

DAVID MOSELEY: The consumer should be wary of anyone selling a product, not a solution. We don't believe in best brands, rather the best tool for the job. You can't select the best tool for the job without a knowledge



The right stuff...

More demo favourites from our panel...

4 JAMES WHITE (Harvey Norman Commercial):

"On Blu-ray, 'The Hit Man' by David Foster has some awesome-sounding concert tracks. And Josh Groban's 'You Raise Me Up' is a cracker! Another classic is 'Open Range' with Kevin Costner."

and the wrong 'uns...

Some dem tracks are used time and time again, so we also asked, 'Is there anything you'd rather never hear again?'...

5 JOHN CORNELL (Audio Junction):

"Dire Straits 'Money For Nothing'."

6 JAMES WHITE: "Maybe the DTS disc of the Eagles' — 'When Hell Freezes Over?'"

7 LEN WALLIS: "I could live with never hearing Adele again..."

of potential problems. A good designer will dig deeper to find the client the best solution and consider questions that have not been asked or challenged because they're an industry professional. A salesperson will likely offer you a cheaper price.

GEOFF HAYNES (Tivoli Hi-Fi): The key to a great demonstration is to sit in the sweet spot, make sure the speakers are toed in towards you and you are seated in the middle seat. Close your eyes and listen to the music and see whether your foot starts tapping. If it does, then you've found your hi-fi system.

LEN WALLIS: The only thing that customers should be wary of — though there is not much they can do about it — is comparing speakers of different sensitivity. They will naturally be attracted to the more sensitive ones, irrespective of quality. As we've discussed, they should also always bring their own (good quality) music.

Q: Comparators — good or evil?

Comparators (switches that allow quick A-B comparisons) used to be the standard in demonstrations, but much less so today. Did our panel have feelings for/against?

JOHN CORNELL (Audio Junction): I feel that comparators are very useful for the demonstration of mid-fi [i.e. mid-range hi-fi] — it allows consumers who are not looking to spend a great deal compare

equipment easily, and get an idea of what can make a difference in the choosing of a system. It is also something they can't get in most chain-store demonstrations.

JAMES WHITE (Harvey Norman Commercial):

"I still feel in some audio demonstration areas they have merit. We used to do it all the time in the old days and it's effective in letting someone quickly hear the differences between systems, especially in two-channel set-ups."

MARK JEISMAN (Surround Sounds):

"From a purist sense of quality these indeed can be a bit naff, but in some ways that can be helpful at a certain level. Rather than using comparators everywhere, we made the decision to drive every pair of speakers with dedicated power amplifier channels all controlled via software, so that rather than the old 'clunker' we have a digital matrix switching the source only. This allows flexibility, but signal quality is not lost. We've done the same with video signal content."

LEN WALLIS:

"They are a necessary evil. There is no doubt that a comparator, and a room full of speakers, has a detrimental effect on the performance of the system. However the advantages of being able to get an immediate comparison outweighs this downside, the reaction from the customer is always positive. Ideally once a choice has been made in a comparator setting the chosen speaker should then be set up in a single dem room for final evaluation."

We have a limit to the value of the speakers we demo via comparator though. Once a speaker value reaches \$3000, they are always demoed in a single-speaker environment."



Digital Residence, Clayfield, QLD

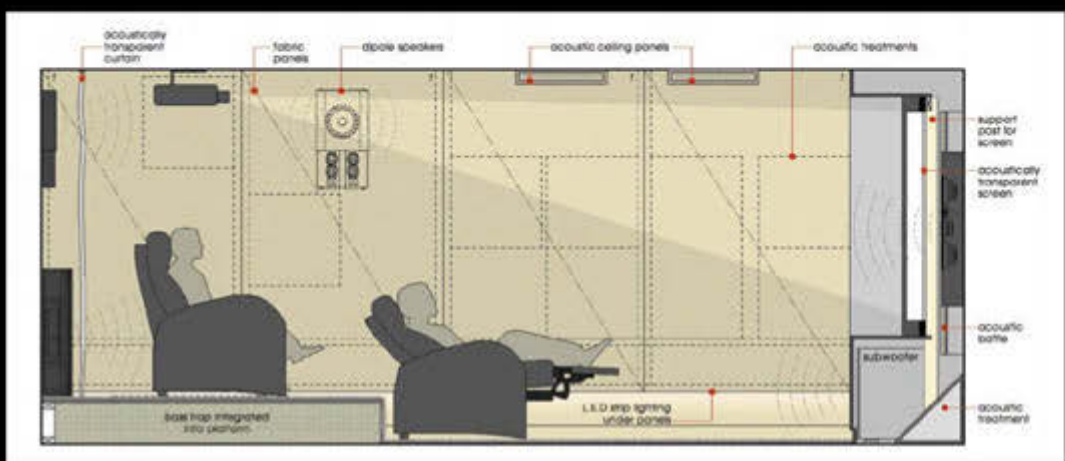
"When people buy Krix they are buying a piece of Cinema DNA," says D-Res's Matt Manalis, talking about the full Krix Series X installation in their X-Cinema — "our big boys' room". Digital Residence in Clayfield, north of Brisbane, also has two other home cinema dem rooms, one with typical lounge-room set-up (wall mounted TV and concealed 5.1-channel audio), and the second for mid-level cinema systems (100-inch screen with 7.1-channel systems). Smart-home tech, two-channel audio and Sonos systems are also on display.

www.digitalresidence.com.au

Wavetrain Cinemas, Taren Point, Sydney

Ten minutes from Sydney's airport, Wavetrain Cinemas has two state-of-the-art dedicated cinemas plus meeting rooms. Demonstrations are by appointment, visitors starting in the 'Statement' room, says David Moseley, "for a sample which sets their grey matter benchmark.... After that is a trip to 'Heaven' [the second highly configurable home theatre space] for a heightened experience." But he warns "it's difficult to have a conversation with clients just after Heaven... it takes a while to go back to routine life." As regular readers will know, Wavetrain has won multiple CEDIA home theatre awards for its work.

www.wavetrain.com.au



Q: How should you audition for a home cinema?

The demonstration of home cinema can be a more complicated process — video enters the equation along with audio, and a full understanding of the system can present quite a learning curve to a new purchaser even of just a television or projector.

With a complete bespoke home cinema, on the other hand, things can be made easier by considering the experience, rather than a series of product. Dedicated home cinemas are often fully installed by the supplier, they may be recommended based on specific physical spaces, and a home cinema dem may be more about understanding the kind of experience delivered at different price levels, rather than fiddling around auditioning different receivers against each other. Often it is the experience and the expertise in room design which is being demonstrated, not the physical kit itself.

DAVID MOSELEY (Wavetrain Cinemas): When a client steps into a fully engineered cinema environment, you quickly realise that the only thing they are thinking is "where is the play button?" We always play a sample first and answer questions after.

Wavetrain is unique, because as an importer, we showcase how our portfolio is

implemented in the holistic solution. Our demonstration facility is essentially the 'proof of concept' of the cinema standards that have been taught throughout the CEDIA industry body — it's a challenging concept to convey without the purpose-built environment to sight. Initially we impart what the standards are, then define how they relate to their particular project. Our demonstrations take three to four hours. Our mission is to deliver positive outcomes in a repeatable manner for each client, every time.

JOHN CORNELL: When purchasing a television or video projector, consumers should always request a demonstration of a local free-to-air television broadcast to gauge quality — typically most chain stores will play all material from a HD generator that will make everything look spectacular until you get the product home. Also, consumers should always listen to music on a home theatre system, rather than playing movies only. Music is more critical and will show up the deficiencies in a cheap system.

DAVID MOSELEY: Most clients do not understand the room as an acoustic instrument and the influence it has. The only way to introduce these concepts is to demonstrate the end result and compare the impact of the room on the system. Most clients don't know what they don't know. Customers with hi-fi systems also love to tinker. Our clients walk away with a new found appreciation of engineering an acoustic environment — it's a science in itself.

Q: What would hi-fi stores like to say to anyone 'scared' of asking for a demonstration?

We often hear from readers who are literally scared of entering a hi-fi store — they feel they don't know enough about hi-fi, and would be imposing on the shop's time. So we asked our panel, what would you like to say to such nervous customers?

LEN WALLIS: Ask anyway! It is expected — they will be the 1000th person who has asked this year, so the dealer will accept it as a normal part of doing business.

JAMES WHITE: Don't be apprehensive, that's why we have the equipment here. They should get together some of their own favourite music, movies or concert DVDs/Blu-rays and bring them along.

JOHN CORNELL: I would always suggest that a consumer at least call their local hi-fi specialist and talk to them about what is current and the latest technology. If you want advice on money you call an accountant because that is what they do — in the same vein this is what we do every day, so we must be up to date with our knowledge and advice

JBL Synthesis – Klapp AV (Windsor, Vic) & Harvey Norman Commercial (Taren Point, NSW)

JBL Synthesis systems are designed to outperform a commercial cinema. As part of the JBL Synthesis Platinum service, JBL engineers out of Los Angeles make system design recommendations for each client's

custom space, with each Synthesis installation calibrated in-home using the company's Arcos system

There are several locations around Australia where you can hear a demonstration of the JBL Synthesis offering in action.

Klapp AV has been operating for 52 years and "we have many different systems on the floor in the showroom with several dedicated rooms for home theatre and hi-fi systems" (top two images below). www.klappav.com.au

Harvey Norman Commercial in Sydney's Taren Point is a huge venue, its AV division having three main open-plan areas plus two cinemas including its JBL Synthesis room (bottom two images). tinyurl.com/HRCNSW



and are happy to pass that on. This is what we live for and are passionate about — rolling out equipment that we have vetted and feel confident about recommending to all and sundry. You would never buy a car before a test drive, and sometimes you have to take a few for a drive before you settle on one. We feel the same about our electronics equipment and are always up for it.

DAVID MOSELEY (Wavetrain Cinemas): The industry is full of passionate people that love entertainment as much as you do! If you are not made to feel at home and invited in, then leave. Visiting a well-known company is no guarantee. It's the individual you are dealing with that will steer your experience. Find someone passionate about what they do, who is proud to talk about their industry.

JOHN CORNELL (Audio Junction): Quite a lot of consumers now read the forums and purchase online based on these discussions. I would say that to them that listening is worth more than a thousand words any day, and can avoid a whole lot of disappointment.

LEN WALLIS: The big one is to avoid making mistakes. For example I think the Axis Voice Box 'S' speaker is a great product, and it is starting to get some very good press. However if you are a heavy metal fan and bought a pair from what you read, it would be a poor choice. Over the years I have disagreed with the findings and opinions of many reviewers on various pieces of equipment. This does not make me right — but I am the one that would need to live with the purchase.

From time to time we do have people that simply take us at our word and buy on our recommendation only. While this may be flattering, I think it is more a case of people not being confident that they could pick the differences — but I know they could, given the chance.

What we say...

Don't think 'I won't be able to tell the difference'. You almost definitely will. And the only places to listen before you buy are specialist dealers. Use them.

Regular readers may have seen advertisements in Sound+Image using the tagline 'Local Hi-Fi Shops — the right place for the right sound'. These weren't placed by any industry association — they were written and designed by our editorial staff, to put forward a message which we think the industry itself isn't doing enough to promote. This article aims to do the same thing. Of course you should listen to hi-fi before you buy it! Our reviews are an excellent starting point to make a shortlist and learn about what's available. Then find a dealer who is friendly when you call and happy to help with a demonstration when you visit. If it costs you a few dollars more than buying on the internet, well, suck it up. You could easily save far more than that if your hi-fi develops a fault, not to mention the extra value on offer in expert advice, local back-up, proper local warranty. And in knowing you're happy with your hi-fi.

Q: What is the value of listening?

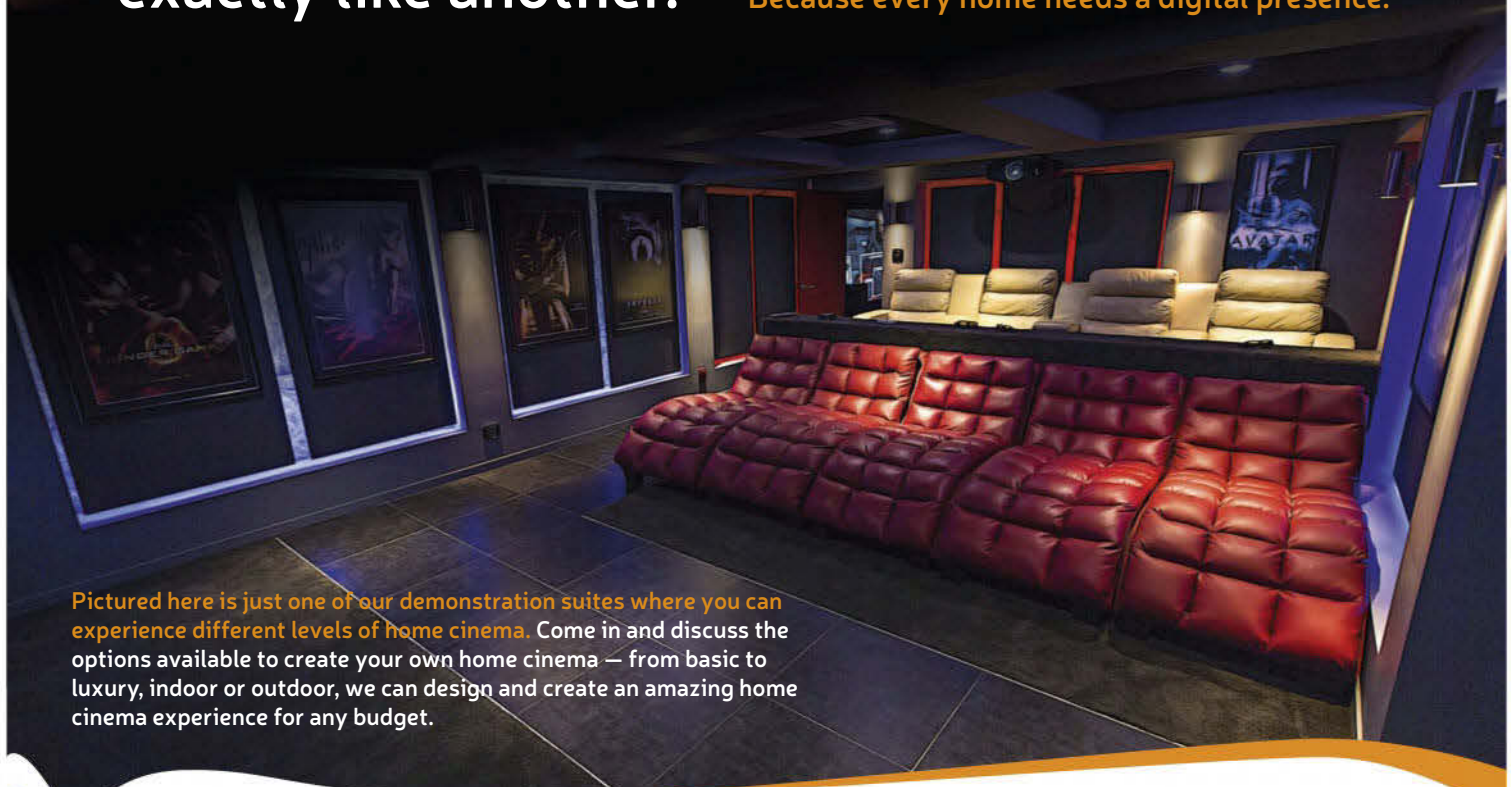


**No home cinema is
exactly like another.**

Our design process starts with a discussion... what you want, how you want us to make it special. Then we use products of excellence from reputable and reliable brands, each component carefully selected to complement the rest of the system.

We are also experts in home automation and lighting control, access and security — talk to us about your smart home solution.

Because every home needs a digital presence.



Pictured here is just one of our demonstration suites where you can experience different levels of home cinema. Come in and discuss the options available to create your own home cinema — from basic to luxury, indoor or outdoor, we can design and create an amazing home cinema experience for any budget.

The Magic of Merlin

Musical Fidelity Merlin

compact system



Stream Bluetooth from your phone, play by USB from your computer, spin vinyl LPs, and let the music flood out. We love the Merlin system.

SUMMARY

Musical Fidelity Merlin

compact system

Prices: amp+speakers \$1599, turntable \$1199, amp+speakers+turntable \$2599

- + Great sound for the size of system
- + Bluetooth streaming & vinyl!
- + Compact and attractive hi-fi

- USB input limited to 44.1/48kHz

We all know the urge to minimise clutter, and for years the trend in home hi-fi has been towards

neatness. People settle for wireless speaker units, they choose soundbars over proper surround systems. Yet these can be alarming choices in terms of sound quality, a compromise of hi-fi performance and the potential joys from high-quality equipment — the whole point of the purchase. If only you could have a proper hi-fi, but one reinvented for today's room requirements and using today's preferred technologies. Well, it's hats off to Musical Fidelity for fulfilling this new-age hi-fi brief with the Merlin.

Equipment

We'll admit falling a little in love with Musical Fidelity's Merlin system before even plugging it up. We had previously seen only images of the dinky system — the mini amplifier and the two oval-fronted speakers in their bright red finish

(silver and black are also available). And the packaging containing all three was indeed surprisingly small. But it was also promisingly heavy, and as we extracted the individual units it became clear there was no sense of cheapness here. The system is compact, but also high quality.

The amp is weighty, the speakers too, and impeccably finished — those red cylinders are metal, not plastic; their speaker terminals are full-sized binding posts, while the speaker baffle behind the solid grille is interestingly shaped and stepped around the 76mm balanced-mode radiator speaker at its centre. (Musical Fidelity calls this a "diffraction multiplier", saying it allows a "huge but accurate stereo soundstage".)

The speaker cables in the box are thick, if quite short at a metre each, and they are terminated in solid spade connectors which make a good connection between amp and speaker terminals.

The amp itself is small, and from a first glance at the back panel you'd think its connections would be minimal given



The mini Merlin amplifier measures only 22cm in width, but finds space to allow six types of input for up to four devices, while delivering a quoted 2 x 50 watts of power.

only a few square centimetres of space for them to the left of the power socket and the speaker terminals. But squeezed in there are a Bluetooth antenna, a micro-USB input that connects with your computer, a minijack which can take an analogue input or an optical one, and a single pair of RCA phono inputs which can take an analogue line-level signal or, via a small DIP switch, a turntable input; an earth terminal sits alongside.

So that's six options available for the four inputs, most likely quite sufficient for the modern home — you might connect your TV to the optical minijack input, your computer to the USB, and use the Bluetooth for ad-hoc music from your smart device, leaving the RCA phono sockets free for the turntable which Musical Fidelity has released with the system. This is called the Roundtable (it has curved corners, but it's a long way from being round), with a felt-matted MDF plinth and a low-resonance nine-inch arm fitted with an Audio

Technica 95E cartridge. As with all the Merlin units, it's finished beautifully and reeks of quality.

Performance

A line of seven LEDs on the front of the Merlin amplifier indicate which source is playing and the status of the unit (green for on, rather bright red for off). There's also a headphone output on the front panel and a press button at either end — power on the left, input selection on the right, shuffling through the available sources in turn.

The central knob is shallow and plastic, but it rotates enjoyably through notches which deliver a slightly more smooth volume adjustment than when using the press buttons on the mini remote control.

While setting up the turntable we got the Merlin running in Bluetooth mode from our iPod touch. We began sitting close in, as for desktop use, with the speakers just 30cm from our ears and angled in so that we were wearing them almost as headphones. This proved highly enjoyable, without a trace of any signal degradation due to the Bluetooth transmission. We should not, perhaps, be

Four ins, six options

In remarkably little space Musical Fidelity has included a pair of RCA sockets switchable between line/phono input, a dual minijack/optical input, a microUSB-B socket for playing from computer, and a Bluetooth antenna.

Speaker sockets

Solid binding posts and two-metre lengths of speaker cable connect the Merlin amplifier with its two speakers.





“We’re no analogue luddites, but there was an emotion emerging from our vinyl that had us quite quaking with happiness...”

surprised by this, having previously been impressed by the Bluetooth inputs of Musical Fidelity’s DACs (which include two recent Sound+Image award-winners, the M6DAC and M1SDAC). But the characteristics of the Merlin system at close range — an airy lightness which lends clarity to everything — perfectly serve the usual softness of Bluetooth. Our first musical choice was the ALT album by Tim Finn and friends, and it proved an ideal exemplar for the Merlin’s strengths, its massed acoustic guitars zinging from left and right speakers, the *vox realite* recording of vocals strong and real in the middle.

The Bellamy Brothers arrived next on shuffle, the 70s’ recording of ‘Let Your Love Flow’ danceably presented, its acoustic guitars clicking perfectly on each side, the vocal centred in its own little world, while the bass sounded natural, realistic, clear and balanced. We had wondered if bass would be a weakness given the system’s size, but it proved audible from 35Hz (all three notes opening Bjork’s ‘Hyperballad’ got their requisite sub-bass portrayed), fullest at 80-100Hz and with the higher ranges impressively flat, or at least clear of dips, while upper vocal registers are particularly well projected.

The only limitation we could hear was that clarity could be lost on material which (like ‘Hyperballad’) has continuous low bass content — we’re guessing the dual nature of BMR speakers may have trouble delivering the higher stuff while their cones are whizzing back and forward delivering continuous low stuff. Together with the limitations of physical size this means that bass levels are ultimately limited, but far from absent, and there’s plenty of clean level available from the amp. At enjoyably medium-to-high volumes the sound from the Merlin system was full, strong, and most definitely hi-fi.

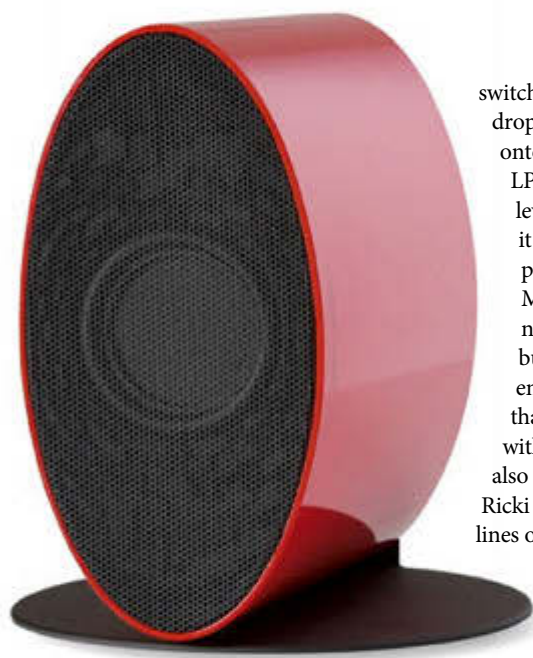
The detail and clarity of delicate recordings was marvellous, revealing, for example, the full extent of the mega-church reverb applied to Brian Wilson’s vocals on his recent duet ‘On An Island’ with She & Him.

Sitting back on the couch with the Merlin across the room, the sound softened back slightly into a deliciously rich and spacious presentation — the soundstage is impressively wide. Note here that the base of the speakers can be shifted to orientate them vertically or horizontally; the former takes up less desk space, but the wider arrangement makes the most of that unusual baffle and best delivers that impressively wide sound-staging. The front-firing sound from the speakers is definitely directional, and we recommend sitting full in their firing line, both BMRs beaming down directly upon you. Here is where the clarity lies. Off-axis their sound is a little becalmed, more boxed, less immediate, less lively.

^ The Roundtable is optional to the Merlin system, but it’s recommended for those with LPs to play — the combination of Bluetooth streaming, USB computer playback and vinyl neatly encapsulates today’s hi-fi trends.

We also tried the Merlin system for TV sound, both via the optical connection from a TV, and via USB from our Mac Mini running Netflix. It was simply glorious — we could hardly believe the width of sound from the horizontally-orientated Merlin speakers, open and detailed, with plenty of presence for dialogue. We watched Disney’s ‘Maleficent’ on Netflix, and the dramatic swirling soundtrack was wide, powerful and immersive in a way that so many soundbars singularly fail to achieve; we continue to recommend stereo speakers either side of your TV (should you not desire a full surround solution) and the Merlin system is an attractive and compact solution that will serve both movie sound and music beautifully. The USB and digital inputs benefit from twin TI PCM 1789 DAC chips, though we noted the USB input from computer tops out at CD quality (well, actually 44.1/48kHz) into the Merlin amp, not at high-res sample rates of 96 or 192kHz.

The turntable, rest assured, is wonderful. It has much in common with Pro-Ject designs (indeed we gather it was made by Pro-Ject to Musical Fidelity’s specifications) and uses a two-position belt which wraps quite low around the platter to drive the rotation. We had loved the Bluetooth presentation, but when we used the mini remote to



switch to the phono input and dropped the AT95 cartridge onto side two of 'The Rutles' LP, it went to the next level — alive and rocking it was, denoting a decent phono stage within the Merlin amplifier. We're no analogue luddites, but there was an emotion emerging from our albums that had us quite quaking with happiness. The bass also seemed more rounded — Ricki Fatarr's McCarneyeque lines on 'Doubleback Alley' rolling out full and clear behind the ping-pong stereo vocals. We continued to play vinyl through this

system for as long as it remained in place.

Those wishing to archive vinyl to computer might do so via the Merlin amp's analogue or digital output; the USB connection does not seem to offer an output path.

Conclusion

Merlin it may be named, but there's no inexplicable wizardry going on here — just an excellent idea for today's lifestyle living, a compact and attractive system implemented with an experienced eye and audio-orientated regard to high-quality design and component selection. Therein lies the magic of this particular Merlin. *Jez Ford*



SPECS

Musical Fidelity Merlin

Prices: amp+speakers \$1599, turntable \$1199, amp+speakers+turntable \$2599

Turntable cartridge: Audio Technica AT-95E

Quoted amp power: 2 x 50W

Amp inputs: phono/line-level, minijack analogue/optical, microUSB, Bluetooth (with aptX)

Amp outputs: speakers out, minijack digital/analogue, fixed/variable

Speaker impedance: 4 ohms

Speaker drivers: 76mm BMR

Speaker colours: Red, silver or black

Warranty: Two years

Contact: Audio Marketing

Telephone: 02 9882 3877

Web: www.audiomarketing.com.au

Award-Winning Sound. Powerful Performance. Game-changing Design.

NAD'S NEW D3020

Hybrid Digital Amplifier has already received numerous accolades for its sound quality, feature set and amazing value for money. The sound experts at What Hi-Fi? Sound and Vision also recently awarded it five stars, saying the D3020 is unlike all other amps in its class.



Their comments included:

"A truly hybrid stereo amplifier, the D 3020 is an inviting prospect for anyone whose sole music system is a laptop or smartphone and has been too intimidated to join the world of hi-fi."

"It's a delightful, toe-tapping performance that really communicates the essence of the song."

"It attempts to deliver the best possible performance it can, and that's what makes the NAD such a likeable amplifier."

"Whether you're looking for a budget way to play your digital music, or want to take that first plunge into hi-fi armed with just a smartphone, the D 3020 is the ideal machine to drive your tunes."

Visit www.nad.com.au for more information



Marantz NA8005

network audio player



Stream Dream

Looking for a new-age hi-fi component to act as DAC while also bringing network and online streaming to your system? Marantz has it covered.

SUMMARY

Marantz NA8005

network audio player

Price: \$1450

- + Excellent network audio versatility
- + Excellent audio performance
- + Excellent build

- Buggy control apps

Now this is what is truly a 'Network Audio Player'. Very firmly an audio-only device, the NA8005 is wonderfully adept with digital audio, delivering it to your hi-fi system in either digital format or high-quality analogue audio.

Equipment

Let's look at the details of what it does. Firstly this unit is a network streamer. That is, it will stream audio from DLNA-compatible servers on your network.

It is also a USB playback unit — plug a USB stick or a hard disk into the front USB socket and you can play its musical contents. It is also an iPod/iPad/iPhone player. Plug one of these into that USB socket and it can play its music contents.

It's a digital-to-analogue converter as well. Plug in optical or coaxial digital audio and it will turn your two-channel digital signals into high quality analogue. Or plug a computer into its rear panel USB-B socket and it will behave as an audio device for your computer (if you install the appropriate driver in the case of Windows).

It also supports streaming audio from the internet, using the vTuner system for internet radio and also supporting Spotify Connect. And you can stream direct from Apple devices (or iTunes on Windows/Mac) using Apple's AirPlay.

The unit decodes just about all popular modern formats: WAV, FLAC and AIFF up to 192kHz, ALAC up to 96kHz, MP3, WMA and AAC including the iTunes version, plus DSD in 2.8MHz and 5.6MHz varieties (see panel).

For output you are provided with stereo RCA sockets, optical digital audio and coaxial digital audio. The two digital outputs have slightly limited functionality, supporting LPCM audio output up to 192kHz sampling for streaming audio, but producing no output for DSD tracks, nor in USB-DAC mode.

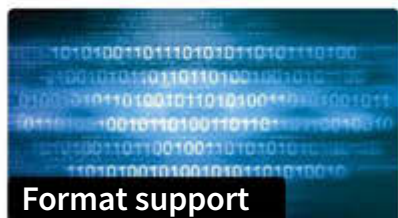
The network connection is wired only, with no Wi-Fi option, so make sure an Ethernet connection is available wherever you plan to situate the NA8005.

Control

All this is delivered in a component-style unit with a three-line front-panel display and an IR remote control. It is all built to



Many ways to control — apps are available for both Android and iOS (you can use the older 'Marantz Remote App' or the new 'Marantz Hi-Fi Remote'), you can access it over the network from a browser, or use the remote control and front panel.



As detailed in the main article, when it comes to playback of your stored music files, the Marantz NA8005 is able to decode just about all popular modern formats. If you want to get snippy you might bemoan the lack of support for some of the less common formats, such as Ogg Vorbis, even though few would recommend such formats these days. But back in the olden days when MP3 encoders were of rather indifferent quality, some people used these formats to maintain higher quality, and so may retain some music only in those formats. The easy workaround would be to convert these to FLAC or ALAC, both lossless formats that will ensure that no quality is lost in a transcode.

the high quality one has come to expect from a Marantz hi-fi product.

But your interaction with this unit is mostly likely to be by using an app on an Android or iOS device, especially as the traditional remote or front-panel controls don't allow easy scrolling through long lists (of albums or whatnot on the server, through radio stations on internet radio, and so on). A rotary control, something with a bit of heft and momentum, would be better for this. As it is, there are no acceleration keys. Holding down the arrow moves through a list at a rate of about three items per second (at least with my server). Just for artists beginning with 'D', that was 40 seconds. A search function works for whichever list you're in, but doesn't search for sub items (e.g. individual tracks when you're in the albums list).

The control apps are available for both Android and iOS. You can use the older 'Marantz Remote App' mentioned in the manual, but when you connect, the app tells you that a new 'Marantz Hi-Fi Remote' is now available. This is a sleeker app, targeted more closely at this unit's specific functions. The main purpose of it is for selecting music from your servers. You can create Playlists (these reside in the portable device, not on the Marantz unit, so they can't be shared between different tablets/phones).

There's a search facility which is either great or useless, apparently depending on the DLNA server software you're using. It would not work at all with the native DLNA server on my Synology NAS, but it worked absolutely brilliantly with the MinimServer DLNA software I run on the same NAS. With that I could simply

Analogue/digital outputs

Given the DAC quality, most users will take the Marantz's analogue outputs straight into their existing hi-fi system. There are digital outputs, but they don't pass audio from the USB input, or for DSD music.

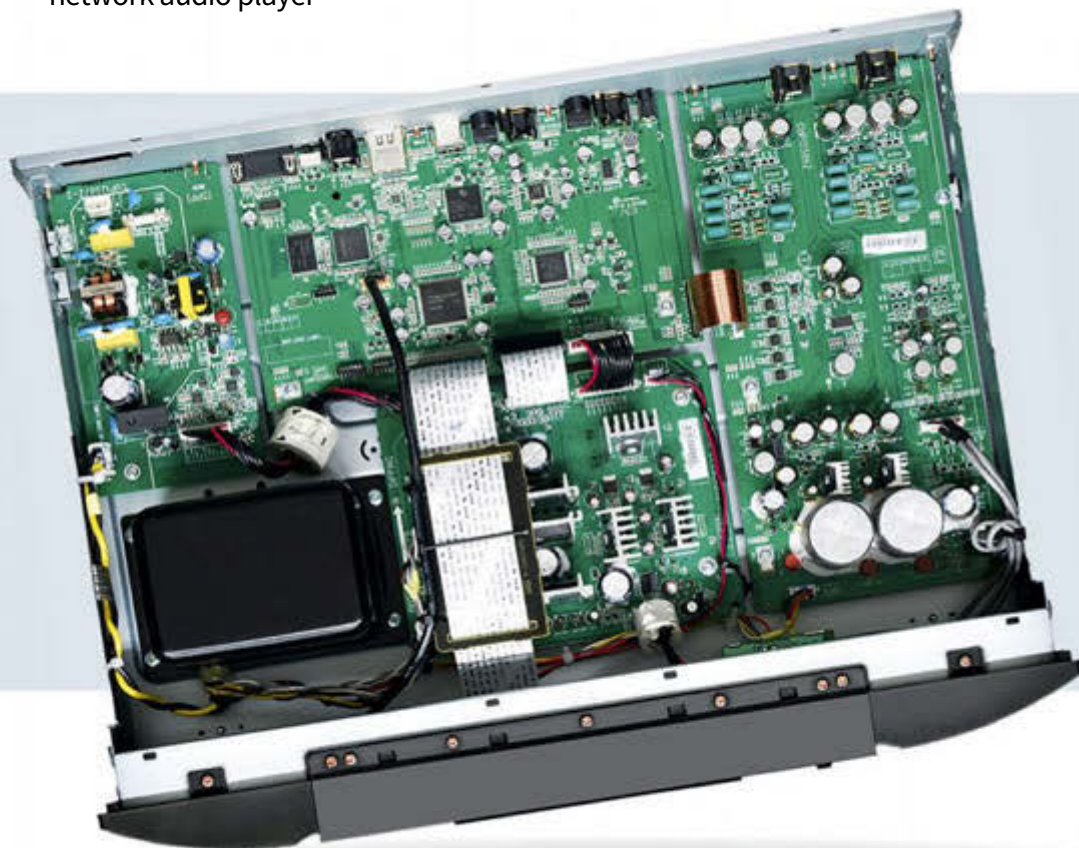
Inputs

There are optical and coaxial digital inputs, plus USB-B for playing music from your computer. There's also a USB slot on the front and direct streaming via the network.

Networking

There's no Wi-Fi networking on this player, so make sure you have Ethernet available wherever the NA8005 is to be positioned.





“Everything sounded beautiful — everything, anyway, that was recorded and encoded with sufficient quality to sound beautiful...”

select the server and type ‘Tangerine’ into the search box and within a second there was a list: the artist Tangerine Dream, the songs ‘Tangerine’ by Led Zeppelin (three different versions) and by Dave Brubeck, ‘Tangerine Puppet’ by Donovan and ‘My Tangerine Dream’ by Wolfmother. I was trying to check the functionality with Windows acting as the DLNA server, but the iOS app interface froze (although it kept playing the current queue). Oh, well. After a couple of minutes it rebooted itself and became operable again.

As it happens, the search function does work on Windows-served material, but only at the current menu level.

If you’re using a server compatible with MinimServer, this is the one to go for, not just for this but also because it’s compatible with DSD.

The screen showing the track playing has the vital feature of showing the format and bit-rate of the current track. Many is the time I’ve selected the MP3 version of a track rather than the FLAC version by mistake. Here you can see instantly what’s playing. (And if an MP3 is encoded with a variable bit-rate, the bit-rate updates every few seconds.)

Overall, I found the apps frustrating due to issues of freezing, crashing and just doing crazy stuff. For example, I was playing my DSD collection using the iOS version and tried skipping a couple of tracks. The app and the player both appeared to lock up. After trying to

▲ The NA8005 features Marantz’s HDAM and HDAM-SA2 modules in critical circuit blocks, including the output stage and the headphone amplifier circuit.

restart the app a couple of times (it just returned to the same state) I switched off the Marantz unit using its front-panel standby key in the hope of causing some kind of reboot. Then I read the manual trying to work out what was going on — when I was startled by music playing. It was one of the other DSD tracks. The unit still looked like it was switched off, but then a few seconds later its front-panel display came to life, showing the track that was playing.

One reliable way of crashing the Android app was to have it displaying in landscape mode, and then rotate the device to put it in portrait mode.

Had the apps been stable, they’d have been great. And as whenever we talk about app problems, there’s always the chance it’ll be fixed in an update.

Of course, you need not use the Marantz app at all. It worked fine with any DLNA-compatible controller app on Android; I used Bubble uPnP to great effect. If you’re happy with lesser digital audio perfection, you can also stream music using Spotify Connect (Spotify subscription required), and AirPlay. The internet radio portal uses the excellent vTuner, so you can set up your favourite radio stations for relatively ready access using a web browser.

There’s also control capability via browser, which is pretty basic, but works. You just key in the IP address of the unit.

Finally, go back and use the older Marantz app. It’s stable and works just about as well. You just have to ignore the message about the new app, plus the various functions that have nothing to do with this unit.

Performance

As usual with these things, new firmware was available for installation as soon as I plugged in the unit — it notified me and I gave it permission to proceed. A couple of time estimates were displayed on the screen as it went ahead: ‘22 mins’ for the first of the two steps, then ‘13 mins’ for the second. Happily, these were extreme overestimates and the whole process took just under three minutes from me clicking ‘OK’ until the unit had rebooted, ready for action. The unit does not display the firmware version number.

Aside from plugging in and downloading and installing the app, there is no setting up to be done, unless you want to use the USB-DAC input. With Mac there’s no particular setting up to be done here either, other than choosing ‘NA8005’ as your output device, and if you want to rely on the Mac’s ‘Core Audio’ engine, setting the output to a high enough sampling frequency to encompass all your content. (Better, of course, is to use music playback software



which can take control of the output so that it can be delivered in its original format; I used the freeware VOX.) Do note that the unit seems to communicate some incorrect capabilities to the Mac, which thinks it will support 352.8kHz audio. In fact the unit will not, but it likely needs to tell the Mac this so that it will pass over double-rate DSD disguised as PCM (i.e. DoP, DSD over PCM). According to the Mac, it also supports all regular sampling frequencies from 32kHz to 192kHz.

Because the USB DAC uses USB Audio 2.0, to use the unit at all with a Windows computer you will need to download and install the appropriate driver from Marantz's website. This provides an interface to the regular Windows driver, but also allows bit-perfect transmission of audio from programs that support it. I used both Foobar2000 and MusicBee. In addition, with the former I was able to use the DoP protocol to send regular DSD music to the unit for decoding. For some reason that eluded me, 5.6MHz tracks (i.e. double-speed DSD128) barely come through, as a kind of fuzz, even though I know the test file itself is okay because when I streamed the exact same thing to the unit over the network, rather than running it through the USB DAC function, it sounded absolutely beautiful. I'm beginning to suspect some serving issue from my Windows computer.

In fact, everything sounded beautiful — everything, anyway, that was recorded and encoded with sufficient quality to sound beautiful. My music, mostly in FLAC, worked perfectly at 16/44.1kHz through to 24/192kHz, the front panel indicating which (as it did

when operating as a USB DAC). The sound fed to the system via the analogue outputs was rich, detailed and complete. Also nice, FLAC music played gaplessly — that is, run-on tracks ran on properly, uninterrupted by momentary silence.

Unlike some high-end DACs, the unit does not offer adjustable filtering curves for 44.1kHz content.

The unit measured beautifully as well. With 24-bit audio the noise floor was typically at or below 107dB(A), and with 192kHz sampling the -3dB point for the frequency response was 50kHz. It seems that Marantz has gone for gentle roll-off filters with this and 96kHz material. A little surprisingly, there were subtle differences between the frequency response and noise performance depending on whether the audio was streamed or played using the unit as a USB DAC. In general the latter gave a very slight improvement in noise performance, while the former had the high frequency performance extended by a smidge. These small differences were totally inaudible.

For 44.1kHz content Marantz has gone for a sharp filter, aided by the use of a Delta Sigma DAC. The response was perfectly flat to 20,500Hz, above which it adopted the shape of a cliff edge. The noise level of 16-bit, 44.1kHz signals was -96.2dB(A) when streaming, -97.5dB(A) when operating as a USB DAC.

Good news for DSD enthusiasts: the DAC chip is a Cirrus Logic CS4398, which among other things features native Direct Stream Digital support. So your DSD music will be going straight from DSD to analogue without passing through a PCM stage. The datasheet for this chip reminds us that the DSD is

low-pass filtered with the -3dB point at 50kHz in accordance with the original 'Scarlet Book' DSD/SACD specifications.

Conclusion

The Marantz NA8005 Network Audio Player is a high quality and effective way to introduce network audio into your audiophile system, along with a broader range of lesser web-streamed music. It sounds excellent, converts DSD directly to analogue audio, and is beautifully built. Marantz will surely improve the control apps, but even if it doesn't there are plenty of alternatives. Marantz is surely on a winner here. *Stephen Dawson*



SPECS

Marantz NA8005

\$1450

Inputs: 1 x optical digital, 1 x coaxial digital, 1 x USB, 1 x USB-B, 1 x Ethernet

Outputs: 1 x analogue stereo (RCA), 1 x optical digital, 1 x coaxial digital, 1 x 6.5mm headphone

Other: Marantz R/C I/O, 1 x RC232C, 1 x IR in

Frequency response: 2-50,000Hz @ -3dB for DSD/PCM @ 192kHz; 2-20,000Hz for PCM @ 44.1kHz

S/N: 110dB (audible range)

Dynamic range: 106dB (DSD/PCM @ 192kHz, audible range); 101dB (PCM @ 44.1kHz, audible range)

Dimensions (whd): 440 x 105 x 336mm

Weight: 7.2kg

Warranty: Three years

Distributor: QualiFi Pty Ltd

Telephone: 1800 24 24 26

Web: www.qualifi.com.au



Epson EH-LS10000

AV projector

Jiggling Lasers

The LS10000 proves to be Epson's finest home cinema projector yet, and it doesn't need the 4K enhancement tech to deliver a superb image.

Epson EH-LS10000

AV projector
Price: \$8999

- + Excellent installation flexibility
- + Superb picture quality
- + Super long life 'lamp'

- '4K' mode softens image
- Slow to resync

A few years ago we got very excited about Epson's new 'R' series of AV projectors. These featured reflective LCD panels rather than the traditional ones through which light passes. This LCoS-like technology was not, Epson insisted, LCoS. In the end it didn't matter because Epson apparently ran into troubles with mass production and the series never hit the stores.

But now Epson's reflective technology is back in the EH-LS10000. Not content with that enhancement, Epson has also included a new LED laser light source to replace the lamp, and also pixel-shifting technology designed to smooth the on-screen image beyond the ability of regular full-HD.

Equipment

So where to start? How about with the regular features first. The EH-LS10000 is one large projector. It would require a box of 550mm by 563mm by 225mm to contain it, and whereas Epson's AV projectors typically weigh six to eight kilograms, this one comes in at a bit over 17, according to my scales. It features the

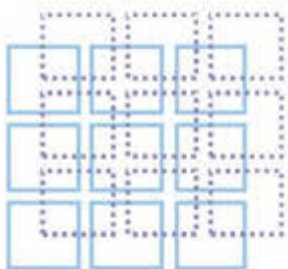
usual inputs, with the connection panel on the back. It's supplied with a louvered panel to clip over this to hide the connections, allowing its clean, curved lines to seem uninterrupted. Even the control panel is on a pop-out section. If you didn't know it was there, you might well think there isn't one at all.

The projector is rated to support via HDMI signals up to full 4K — 3840 by 2160 pixels at 24, 25, 30, 50 and 60fps, plus 4096 by 2160 pixels at 24, 50 and 60fps.

Two things about this. First, there is no point upscaling existing content to 4K/UHD for use with this projector. You merely place greater demands on the bandwidth performance of your HDMI cable without seeing any real improvement at the other end. Epson knows perfectly well how to make best use of full-HD signals to drive its projectors.

Second, nonetheless, this 4K support is a potentially useful feature. Say you have an AV receiver with dual HDMI outputs, one feeding a 4K TV, the other to this projector. If you have actual 4K content available, the receiver may not pass it through to the 4K TV at full

4K enhancement



Although the Epson projector can accept a 4K input (3840 x 2160), its panel resolution is still full-HD (1920 x 1080). Instead of projecting each pixel to one designated place on your screen, the pixels can be rapidly shifted diagonally by up to half a pixel in distance, allowing, on a naive view, a kind of replication of 4K resolution. In fact it cannot achieve this because each pixel is still four times the size of a 4K pixel. What they can do, notionally at least, is fill the jaggies left by normal pixels on high contrast edges, smoothing them.

We weren't too keen on the results (see main article). If you set it to '4K-1' mode, the picture looks slightly softer than having 4K switched off, even from a regular viewing distance. But the '4K-3' mode applies some edge enhancement to sharpen things up again, producing ghosting around the edges. At first glance it's a sharp, powerful image, but after a while it gets tiring. The 4K input compatibility is useful, but we'd suggest keeping the LS10000 in full-HD mode to best enjoy its excellent projection quality.



Keeping it smooth — the controls for the EH-LS10000 pop out of the projector's side so that the smooth curves of the projector body are unbroken when in use.

resolution if the other display device can't also support 4K.

Back on the basics, Epson provides enormous installation flexibility, as is its usual practice, with a wide lens shift, both horizontally and vertically, and a wide zoom range of 2.1-to-1. For our standard 100-inch screen reference, the projector needs to be placed between 2.83 metres and 6.04 metres away. The adjustments were easy to apply, thanks to motorised everything (focus, zoom and lens shift) including the retracting lens cover. You can hold down arrow keys to power through large adjustments, or tap them for fine adjustments.

The projector supports 3D, and two sets of rechargeable 3D glasses are provided. They sync via RF.

A new engine

The special interest in this projector, though, is the new projection engine. This has three innovative elements: the reflective panels, the LED laser light

source, and the '4K Enhancement' technology. The reflective panels share the advantages of LCoS. For LCD panels to work, the pixels must each be wired up. If the light passes through the pixel, some of it gets blocked by the wiring, which typically goes around the edges in the grid space. Reflective panels have all their wiring and any other support components behind the surface, so each pixel can fill a larger proportion of the grid space, increasing efficiency and reducing any screen-door effect (though really, screen door hasn't been much of an issue with full-HD projectors).

These panels also offer '4K Enhancement' (see panel, left) by means of pixel-shifting technology.

The light source is particularly interesting. Instead of a conventional glass bulb lamp, which is good for a few thousand hours before requiring replacement, the LED laser light source is rated at 30,000 hours. That's 15,000 movies, equivalent to a movie every night

A lamp that last 41 years...

With an LED laser light source, the days of counting down to lamp replacement are gone. The LED should last 30,000 hours.

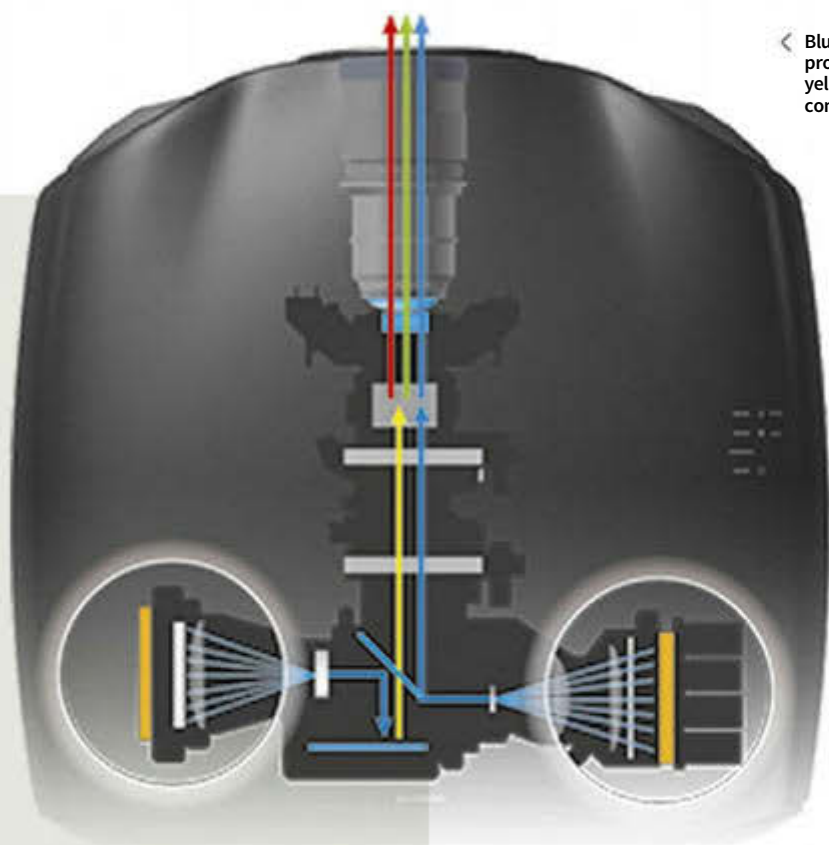
Big fella

This Epson is no desktop portable — its size is impressive, requiring a box 55cm square and 23cm high to contain it.

Smooth lines

We love the curvaceous styling of this projector. Even the controls pop out so its curves remain unbroken.





Blue laser light excites two phosphor panels inside the projector, one producing blue light, one yellow. The yellow beam is then split optically into red and green components, thereby delivering the required RGB.

“The LED laser light source is rated at 30,000 hours, equivalent to a movie every night for 41 years!”

for 41 years! With this projector, the days of worrying about lamp replacements are over.

The lamp works by having banks of LEDs produce blue laser light which is directed at phosphor. The phosphor is excited by the energy into producing a very bright light. In fact, this projector has two such assemblies. In one there are 18 laser diodes and the phosphor produces yellow light. This is split optically into red and green. The other has 16 laser diodes and its phosphor produces blue light. Thus we have the necessary RGB.

Epson tells us that each of the diodes has an output power of 1.4 watts, which amounts to 47.6 watts in total. The input to the lamp assembly is 250 watts, so the whole thing runs at around 20%

efficiency, which seems comparable to conventional lamps.

In addition to long life, this light source has the advantage of instant switch on and switch off.

Performance

There is no doubt about it: the Epson EH-LS10000 is the finest Epson home theatre projector yet, which means it is one of the finest ever full-HD projectors. It produces a glorious picture, with good deep blacks and accurate, powerful colours. The panel alignment was perfect. The optics are capable of producing a super-sharp picture.

But in order to achieve that sense of focus and clarity, you will have to delve into some of the settings.

The projector produced a satisfyingly bright picture with the ‘Medium’ setting for ‘Power Consumption’. This was about 75% of the brightness of ‘High’ and reduced the fan noise from moderate to very quiet. ‘Eco’, at about 53% of full brightness, is usable with a screen that isn’t too huge in a well-darkened room, and it further reduced the fan noise to near inaudibility. I went with ‘Medium’ for most of my testing. Brightness at the screen corners was about 83% of the value at the centre of the screen. That, to my eyes, made the screen image look perfectly uniform.

In the specification box for ‘Contrast Ratio’ Epson says ‘Absolute Black’. It is and it isn’t. If there is anything at all being projected on the screen, other than 100% black across the entire screen, then the black parts of the picture are not absolute black. Some light is still projected, but it is extremely low in level, resulting in excellent blacks, very satisfying, with never any sense at all of a loss of low light detail. This was a top-notch performance.

The ‘Absolute Black’ comes in with the ‘Dynamic Contrast’ setting. Unlike a number of Epson’s other models, the projector does not have an iris capable of adjusting automatically, frame by frame, to control the light level for the image. With this projector, ‘Dynamic Contrast’ controls the lamp brightness.

However, regardless of setting, it did not seem to do this while there was any non-black content being projected, no matter how ‘almost-black’ it was. What it did was turn down the lamp all the way to off whenever there was a full black screen. In ‘Normal’ mode this involved a five-second ramping down. In ‘High Speed’ mode there was an instant switching off.

The 3D performance was not quite as good as that of DLP, but not far short of it either. Epson seems to have incorporated its crosstalk cancellation system (model the leakage, invert it and feed it into the signal for the eye where the leakage would occur), so there was almost no ghosting. If I paused a 3D disc and scrutinised the picture closely, sometimes I could detect a slight mismatch where the cancellation may have been very slightly overdone or underdone. In regular viewing this was not at all visible, leaving a convincing and engaging 3D effect.

Now let’s get to an unfortunate part of this projector: it’s ‘4K Enhancement’ feature. The good news first: you don’t have to use it. You can switch it off and pretend it doesn’t exist. And that’s what I’d recommend. The bad news: it promises something it can’t deliver, and pretends to do it by pulling a trick.

As suggested in the panel on the previous page, if all you’re doing is moving full-sized pixels around, the best you can do is fill in edge jaggies. This the ‘4K Enhancement’ process does quite effectively. Unfortunately, the subjective



^ 4K-3 Enhancement ON
Some jaggies are filled in, but ghosting is created around some edges.

^ 4K enhancement OFF
More jaggies, notable screen-door when close up, but no ghosting.

effect of this is to soften the picture slightly. The easiest way to see this is to look at the projector's own menus. (The 4K applies to the whole screen, including menus, but other picture enhancement processes do not apply to menus, so you can isolate the effect of the 4K feature.)

The first of our two images shows the 4K enhancement menu with the projector in its default mode, set to '4K-3'. The second is the same menu with 4K enhancement switched off.

On the first you can see how the 4K enhancement has filled in the jaggies on the 'l' between the words 'resolution' and '4K', around the 'O' in 'Off', and elsewhere. It has also completely eliminated the still-visible pixel grid (which is visible when up this close, though not at all from a regular viewing distance).

Yet the processed menu just looks soft, slightly out of focus.

That also applies to the picture. If you set it to '4K-1' mode, the picture looks slightly softer than having 4K switched off, even from a regular viewing distance. But the '4K-3' mode applies some edge enhancement to sharpen things up again. Indeed, from a regular viewing distance it looks sharper than with the 4K off. But it comes with the usual problems of edge enhancement: ghosting around the edges that can make the picture look a touch harsh and confused. Look at the word 'overscan' at the top of the images, and the ghosting is clear in the 4K-3 version.

At first glance, the '4K-3' mode presents a sharp, powerful image. But after a while it gets tiring. We'd suggest switching '4K Enhancement' off.

There's a lot going on with this projector in terms of image processing, and that slows it down. It took an average of ten seconds when the format changed before the projector resynced and displayed the image again. That made it difficult to change the resolution on some equipment that only gives you a few seconds to confirm the change.

The picture was also delayed by almost a quarter of a second (242ms) in projection. But the projector supports automatic lip sync — a surprisingly rare feature these days — so most modern home theatre receivers will match the sound and vision seamlessly. There's a fast processing mode which cuts things back to just 57 milliseconds, which ought to please those attempting to control a racing car with their games machine.

Conclusion

Even though we weren't fans of the 4K enhancement, the Epson EH-LS10000 is a first-class home cinema projector, with excellent optics, fine new reflective panels and a laser light source that eliminates the need to ration use or worry about lamp life. It should be on the shortlist for anyone looking in this price range.

Stephen Dawson



SPECS

Epson EH-LS10000

\$8999

Projection technology: 3 x 18.8mm reflective polysilicon panels

Resolution: 1920 by 1080 pixels

Aspect ratio: 16:9

Lamp: Blue laser/phosphor

Lamp life: 30,000 hours (Economy mode)

Contrast ratio: 'Absolute Black' (see text)

Brightness: 1500 lumens

Inputs: 2 x HDMI, 1 x component video, 0 x S-Video, 1 x composite video, 1 x D-SUB15

Control: 1 x RS-232C, 1 x LAN, 1 x trigger

Dimensions (whd): 550 x 225 x 563mm

Weight: 17.25kg

Warranty: Three years (Three years lamp)

Contact: Epson Australia

Telephone: 1300 361 054

Web: www.epson.com.au



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OLED930T

LG ELECTRONICS 55EC930T OLED TV

"OLED beats 4K at 55 inches"



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yamaha500

YAMAHA 500 SERIES SPEAKER PACK

"A taste of Soavo!"

Philips 58PUT8509

4K/UHD television



All Aglow with 4K

Philips TVs are back in Australian AV specialist dealers, and judging from this example, their quality remains high.

SUMMARY

Philips 58PUT8509

4K/UHD television

Price: \$2699

- + Good quality picture
- + Good value for money
- + Great control apps with screen mirroring

- No automatic lip sync adjustment for processing delay

Long time no see. It has been some years now since Philips withdrew from the Australian TV market. It was one of those brands which offered a premium product at a premium price — one consumers perhaps weren't prepared to pay in sufficient numbers to make it worth Philips' while. But now Westan Australia is handling them.

And the good news is, at least judging by the price of the 58PUT8509, the price is actually comparable to other brands.

Equipment

Just to clarify the distribution (since several companies now handle Philips TVs here), Westan's focus is on growing Philips' market share in the AV specialist retail sector, and also in B2B channels such as hospitality, pubs and clubs and aged care. Tempo Australia also distributes some models through Harvey Norman and Myer, while Avico Electronics supplies Philips panels for the hotel industry.

But back to the hardware. Perhaps the first interesting point about this TV is the

screen size. At 58 inches, it's a noticeable boost in picture size from a 55 inch, yet isn't as overwhelming as 65 inches, the normal step up in most product ranges. So this is a 147cm Ultra High Definition TV, which of course means a resolution of 3840 by 2160 pixels of resolution.

It features a slim body, just 38mm deep without the stand, and a thin bezel. The sides and top occupy 14mm between the edge of the picture and open space, but appear a little thinner due to tapered edges. At the bottom it's 34mm wide. The result is a large picture almost uncontained by any framing.

In these days of TVs leaning more and more to wide stands, it was a surprise to find this stand both skeletal and capable of swivelling. The dark brushed metal was inconspicuous, but attractive to the extent that it was noticeable.

The TV has four HDMI inputs — unusually, all four support the Audio Return Channel — plus shared inputs for composite and component video. There are two analogue audio inputs as well. Modern media is covered by two USB sockets, and you can use one of



Excellent apps for iOS and Android can work as portable second screens for broadcast content, and can also deliver video, photos and music from network resources to the TV.

Lighting your lounge

Philips offers its 'Ambilight' system on some of its higher-end TVs. This derived from the general recommendation, years ago, that in a darkened room it's a good idea to have a gentle light behind the TV against a 50% grey surface to reduce eye strain. But back then TVs were small. Philips has enhanced this, casting light behind the TV in ways intended to complement what's on the screen. You can even pair Ambilight TVs with Philips Hue lighting products, to extend the colours throughout your room.

With this TV there are ten small light emitters, capable of changing colour, for the Ambilight system down each side of the rear of the TV, plus 22 across the top rear.

We haven't commented too much on Ambilight in our review; we're not great fans of using it longterm, and switched it off while reviewing. But, hey, you may like it.

these to attach 4GB of flash memory to buffer broadcast TV data so that you can pause live TV, or a hard-disk drive both to pause and to record. Also provided is a network socket, plus built-in dual-band Wi-Fi. Quite a few smart features are available, as outlined below. Both optical digital audio and a 3.5mm analogue headphone socket are provided.

The 3D system is active, with the glasses syncing via IR. Two sets of 3D eyewear are included. These are very light (23 grams) including the single low-cost button cell that powers them. The TV also supports FreeviewPlus.

And the remote control itself is pretty nifty. It's a double-sided unit, with regular TV controls on one side and a QWERTY keyboard on the other. This works in RF rather than by IR, except for the power on key.

Performance

The TV starts up first time with a wizard to guide you through the setting up process. Most of this is unremarkable, except for a set of picture and sound settings. These are for brightness, contrast, colour and sharpness, plus a choice of three sound profiles. The picture settings each give you three choices — more, less or skip. These are, to be blunt, quite useless. You choose based on whatever happens to be showing, and have no benchmark.

At the end a 'Personal' picture set-up is left in place based on those selections. Even choosing 'Less' for Sharpness it was at the middle setting, which produced marked artefacts on test patterns or anything with hard high-contrast edges, and also tended to posterise what should have been smooth colour graduations, especially on human faces, creating an artificial flatness. It was weird. The Sharpness control actually left little lines between slabs of slightly different shades of white. Going into the proper picture setting menu, I found that choosing 'Standard' picture 'style' and winding down sharpness to zero produced a very smooth and accurate picture.

(As an aside, why does the sharpness control on so many UHD TVs, as on this one, produce artefacts several pixels wide? Wouldn't one suffice?)

Anyway, those who like their picture to appear sharper than the source material can usefully put this control on '1'. This kept artefacts to a minimum.

The 'Standard' picture set the full white and full black setting to the correct levels and an even ramping of grey levels between. The colours were impressive and convincing. Under room lights the picture was bright, and even in a full dark room the black levels were fairly deep and reasonably smooth.

I'm fairly sure that Philips invented motion-smoothing frame interpolation.

Ambilight

Philips' Ambilight illuminates the wall behind the TV using small lights — on the reviewed 8509 model (a different model is shown here) there are 42 lights in total along three sides of the TV. These can deliver fixed colours or can be set to vary in hue automatically based on the onscreen content. Modified by a light sensor, they are able to adapt depending on your wall colour.





“Attach 4GB of flash memory to buffer broadcast TV data so that you can pause live TV...”

Certainly I first reviewed such a system on a Philips TV about 15 years ago. It has come a long way since then. This TV defaults to having its ‘HD Natural Motion’ set to the maximum of three levels (you can also switch it off). This produced a super-smooth, highly attractive picture, if a bit too glassy, marred by some heat-haze artefacts and some weird interpolation errors at the boundaries of complex objects moving alongside other slower-moving objects. The Minimum and Medium settings gave intermediate levels of smoothing while leaving the picture far closer to its original state, and with just about no visible artefacts.

The active 3D was very effective, with truly impressive depth and roundness to the layered images. This despite some reverse ghosting. Where light objects were over dark ones, the image was clean. With some darker colours over light ones, though — for example, red over sky blue — the ghosting took the form of a lighter blue in the shape of the red object, but offset. This suggests that the TV employs some crosstalk cancellation technology, but overdoes it in some cases. Nonetheless, this TV is one of the best 3D UHD performers I’ve seen. The one complaint: despite setting the 3D mode to ‘Automatic’ in the menus, I still had to manually invoke it each time through the menu system.

With the default picture settings the TV imposes an extremely long delay on picture display, well over 200 milliseconds, the upper limit of my test meter. A test pattern made it clear that it was over 250 milliseconds — that is, more than a quarter of a second, I’d estimate 280ms or so. This is so long that lip-sync problems were disconcertingly obvious, even to me, and I’m fairly insensitive to

it. The TV does not apparently support auto AV sync via HDMI, so I set my receiver manually to 280ms delay, and that brought things precisely back into alignment.

For gamers, of course, such a delay would make play impossible in any game which requires quick player response. Fortunately there are ‘Activity’ settings on this TV, one of which is for games. This switches out a lot of processing and gets the picture delay down to around 40ms, which makes it very suitable for game play.

Smart stuff

This is also a full-fledged smart TV. It has 18 apps pre-installed — things like Vimeo, YouTube, Facebook, Deezer, Picasa, Netflix, news and weather — plus another 18 ready for installation, mostly games and entertainment. There’s a web browser which works pretty well. The non-IR remote control assists some data entry thanks to the alphanumeric keyboard on the flip side.

Still, things worked much more nicely with a USB dongle and a wireless keyboard and mouse. There’s also Skype — you’ll need to add a USB camera/microphone option and go to the main menu rather than the apps to run this. Australian TV catch-up services are available via FreeviewPlus only.

I was a little excited by the multiroom client and server functionality, by which the TV could share broadcast stations with other TVs on the network. Turns out that means to other compatible Philips smart TVs, so I couldn’t test it.

That said, there are brilliant apps for Android and iOS that work with this unit. With the app they can work as portable screens for whatever broadcast

TV is showing (there’s a delay of about 3.5 seconds). You can also send video, photos or music from network resources to the TV. It also supports Miracast if you have a compatible Android device.

The TV was excellent at displaying photos from USB and the network, maximising resolution to make best use of its UHD panel. My purpose-designed 3840 by 2160 pixel test image was delivered at full resolution, including full resolution for the colour. It also played FLAC music in addition to the usual fare of MP3 and AAC (but lest you think it too perfect, it would not play DSD). It did a fine job on all my test videos, apart from the 4K ones which it would not play either via network or from USB. If you’ve got 4K video, you’re going to need an external player to feed it via HDMI. (It wouldn’t see my 3D *.mpo photos either, so you’ll need an external 3D player for those.)

Conclusion

It’s great to see Philips TVs back in Australian specialists, and this model certainly proves to be both competent and reasonably priced. It is well worth a look. *Stephen Dawson*

SPECS

Philips
58PUT8509

\$2699

Tested with firmware:

QN142A_036.001.206.048TSR

Display technology: LED backlit LCD panel

Screen size: 147.2cm

Native aspect ratio: 16:9

Native resolution: 3840 x 2160

Brightness: 350 cd/sq m

Contrast ratio: Not stated

Energy Rating label: 5 Stars, 343Wh per year

Inputs: 4 x HDMI, 1 x component video (doubles as 1 x composite video), 2 x stereo audio, 2 x USB, 1 x Ethernet, Wi-Fi, 1 x aerial

Outputs: 1 x optical digital audio, 1 x headphone (3.5mm)

Amblight: three sided, 42 light sources (10 + 10 + 22)

Audio: 20 watts

Included accessories: Table top stand, remote control, 2 x 3D eyewear

Dimensions without/with stand (whd): 1299 x 769 x 38/1299 x 828 x 300mm

Weight without/with stand: 24.0/25.6kg

Warranty: One year

Contact: Westan Australia

Telephone: 02 8033 2186

Web: www.westan.com.au

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- 7 Days Backward EPG
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- Manual Repeat Recording
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- Live Channel Streaming to Mobile Devices
- Wireless Streaming Display
- Full Browser
- Local Catch Up & VOD[^]
- FTP/SAMBA

HUMAX

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Images are for promotion purpose and may differ from actual display. [^]Internet connection is strongly recommended to enjoy many advanced features and gain maximum viewing benefits. [^]Contents and series recording functions depends on broadcasters and providers. Usage will add on to your internet usage.

Sony SS-AC3P
stereo loudspeakers

Smooth Standing



Sony proves again it can deliver high quality hi-fi speakers, even when combining 12 separate drivers to deliver stereo.

Sony is a brand that often lets Australians see only a select portion of the higher end products it sells in its home market. But lately it has been making available some of its quality loudspeakers, of which the SS-AC3P speakers are an example. At \$3599 for a pair, they are clearly not mass-market offerings.

Equipment

These are genuine floorstanders, reaching 960mm in height. The enclosures are bass reflex loaded with two rear ports, one in the bottom third and the other near the top of the enclosure, and at about 20cm width their enclosures aren't as narrow as you might expect from the driver width, and are fairly deep at 295mm.

The main tweeter sits at 870mm above the ground, which puts it fairly close to the ear level of those seated on a couch. 'Main' tweeter? Yes, there are three! — above and below the 25mm soft-dome tweeter are a pair of 19mm units, presumably tasked with carrying the output to 40,000Hz. With a vertical array of tweeters, you can expect a decent horizontal high frequency dispersion, but limited vertical dispersion. For this reason it's particularly important to

ensure that the larger tweeter really is at ear level, or at least pointed at ear level for the main seating position.

A 130mm midrange sits below this tweeter array, and further down the cabinet are two 130mm bass drivers. While the mid and bass are the same size, they are visually very different drivers, not merely the same models repurposed.

Sony rates their frequency response at 45 to 40,000Hz at -10dB, their impedance at six ohms, their sensitivity at a lower-than-usual 86dB (for 2.83 volts input) and their maximum input at 100 watts. A single pair of high quality binding posts are provided for each loudspeaker — no bi-wiring here!

Performance

It was almost instantly apparent in listening that these loudspeakers seemed to belie the specifications provided by Sony. And we mean that in a good way. Aside from the lowish sensitivity, the speakers really delivered the goods. Of course, being of low sensitivity, you

SUMMARY

Sony SS-AC3P
stereo loudspeakers
Price: \$3599

- + Very pleasing sound
- + Better bass than specified
- + Excellent (and interesting) stereo imaging
- HF down compared to the rest

Speaker sockets

High quality binding posts are employed on this high quality speaker, though only a single pair, so no biwiring or biamping here.



Super tweeters!

Not one but three tweeters adorn each Sony speaker, enabling its frequency response to rise as high as 40,000Hz.



Enclosure disclosure

The cabinets are 96cm high, bass reflex loaded with two rear ports. The grilles attach magnetically to the front baffle.



shouldn't skimp on amplifier power — I had 150W per channel on tap.

And forget about any preconceptions you may have about 'Japanese' loudspeakers. From the opening strains of 'Where Do You Think You're Going?' on Dire Straits' second album, the instruments hovered in space a metre above the floor, tangible and precise, yet restrained and smooth. It was clear that these loudspeakers ooze quality. There was plenty of detail, yet a certain mellowness to the sound, eliminating harshness and making even Mark Knopfler's voice more pleasant than serviceable. The cymbal strikes were clean and sharp, as was Knopfler's picking, while the bass guitar and the drums were balanced, easy to follow and reasonably well extended into the depths.

Vladimir Ashkenazy's rendition of Beethoven's 'Appassionata' was wonderful with these speakers, with the proviso that they had to be turned up loud, way up loud. A low-level encode on Decca CD, there was the usual analogue tape hiss, restrained a little more than usual, despite having the level on the home theatre receiver turned up to -2.5. In general I found myself having the volume up around five or six decibels higher on the receiver's scale than usual. At least part of this was that these speakers absorbed the power without apparent effort. And despite that, Ashkenazy's left hand on the piano keyboard was revealed in all its complexity, even in the midst of an extraordinary torrent of keys.

Schubert's 'Unfinished' Symphony, delivered by the Scottish Chamber Orchestra conducted by Charles Mackerras, also needed an advanced volume knob. The percussive elements struck through excitingly with force, with precision, while the massed strings were rather smoother than usual, suggesting a slight diminution of harmonics.

Returning to material that spends much of its time using the full scale of the CD, 'Killing in the Name' on Rage Against The Machine's self-titled album was admirably clean and controlled, without the slightest touch of confusion, despite rather high levels. It was a touch easier on the ear, despite the volume level, bringing into focus a little of what was going on. It wasn't just that the speakers were low in sensitivity, but that the upper octaves were somewhat recessed, delivering smooth sound that couldn't help but be gentle to one's hearing, and thus seemed quieter than it actually was.

I conducted a few measurements to see what was going on. What was most surprising was the bass response. Sony claims an output down to 45Hz at -10dB. My measurements suggested that the bass response was flat down to spot on 30Hz, with the output rapidly diminishing below that. Even in a real room, the speakers produced a quite smooth output from 60-6000Hz, providing a very accurate coverage of the bulk of the most musically important octaves. Room effects, of course, made the bottom end wobbly, while at the upper end, measured at one metre on the tweeter axis, the treble output sloped down from 6000Hz to be down by around 6dB at 8500Hz, whereupon it maintained this level to the limits of measurement, around 20,000Hz.

That's the obvious explanation for the gentleness of the sound delivery with these speakers.

The woofers handled the output by direct radiation down to 60Hz, while the lower rear port did duty from about 70Hz down to what looked like a tuned peak at 30Hz.

The upper rear port was bit of a puzzle. It was definitely doing some work, acting as though it were a band-pass filter, allowing significant

output between 640 and 880Hz. The purpose of this was unclear. Sony doesn't indicate the crossover frequencies between the drivers. Perhaps this is bass loading for the bottom end of the midrange driver. I'm not sure that I approve on a technical level, given that phasing is likely to be off for this band of frequencies.

Conclusion

The Sony SS-AC3 loudspeakers are immensely pleasant to listen to, taming the excesses of poorly recorded material, and delivering a stereo image that is highly coherent and at times quite entrancing. That pleasantness can be at the expense of precision, given the step-down in high frequency output, and available power is a vital ingredient for these loudspeakers. But with that, there's a lot to enjoy. *Stephen Dawson*



SPECS

Sony SS-AC3P

\$3599

Drivers: 1 x 25mm soft-dome tweeter, 2 x 19mm dome tweeters, 1 x 130mm midrange, 2 x 130mm bass drivers

Frequency response: 45-40,000Hz -10dB

Impedance: 6 ohms

Sensitivity: 86dB (2.83V/1m)

Power handling: 100 watts 'Maximum'

Cabinet: Bass reflex

Dimensions (hwd): 960 x 197 x 295mm

Weight (each): 18.5kg

Warranty: Three years

Distributor: Sony Australia

Telephone: 1300 13 7669

Web: www.sony.com.au

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Humax HDR-3000T
personal video recorder

Hidden Talents

Humax has hidden some surprising levels of functionality inside its unassuming new PVR...

The Humax HDR-3000T is an unusual PVR. Some aspects of it are markers of an entry-level product, but others are very advanced. Astonishingly advanced, in fact.

Equipment

In entry-level terms, this is a twin-tuner 500GB PVR which doesn't even have a front-panel display. That seems pretty basic by today's standards.

But not all is as it seems. The compact unit departs from the usual boxy shape and features a leather-texture top which looks rather attractive. And those two tuners permit the recording of four programmes at once, from up to two broadcasters, while other features and well-developed functions make the unit stand well out from the crowd.

Performance

Setting up the unit is simple. A wizard walks you through a number of steps, including the network. Perhaps the only thing that might confuse new users is the choice offered between the regular EPG and the 'IP EPG'. More on that below.

The network connection can be by Ethernet or by using the included USB Wi-Fi dongle (2.4GHz band only).

Broadcast station scanning was quick and certain, and you can go into Channel Settings and delete the repeated channels (e.g. ABC 21) to streamline the channel list. You can also set up multiple 'Favourites' lists.

The picture quality produced by the unit was first-class. Initially there were some dropouts, even though the signal (there's a meter in the set-up menu) was strong. You can, of course, overload digital tuners, so I whacked 9dB of attenuation on the antenna input and things smoothed out nicely.

The unit supports output resolutions up to 1080p or down to 576i. Although it doesn't have an option to simply follow the resolution of the signal, you can easily change the output resolution via the options key on the remote, should you prefer to have the deinterlacing or scaling performed by your receiver or display. But the progressive-scan conversion itself seemed quite solid, applying motion-adaptive techniques to provide a fine picture.

Recording

Ad hoc recording was easy to start and easy to change. A hit of the record key starts recording the current programme immediately, with it set to stop recording at the end of the programme (plus the padding that you've set). If you've had that channel on for a while, the contents of the buffer back to the start of the current programme will be included as part of the recording. Hit the record key again and you can change the duration.

But most recording is programmed via the EPG. And it is this unit's EPG that offers the biggest advantage over other brands. Certainly, the unit can use the regular guide broadcast over the air. But

SUMMARY

Humax HDR-3000T
personal video recorder
Price: \$449

- + Superb IP-based EPG with remote recording
- + Solid picture and playback performance
- + Good network support

- Tuners may be a touch sensitive to being overloaded by strong signal

it also has available what it calls an 'IP EPG'. 'IP' stands for Internet Protocol. So what we have is an EPG that is automatically updated from the internet by the unit.

So what? Does it have more or special information? Actually, not a whole lot more, although the extras it has are rather useful. For one thing, many TV episodes, in addition to the usual description, also show the season and episode numbers. If you land in the random episode of a long-running TV series, this helps a great deal in locating the episode on IMDB so that you can check if that walk-on role really was filled by someone destined to later become a star. They also have still frames to give a visual clue as to the programme. In addition, you can go back in time. The old EPG entries aren't erased, so you can go back to earlier shows, select them, and choose to series record them in the future from there.

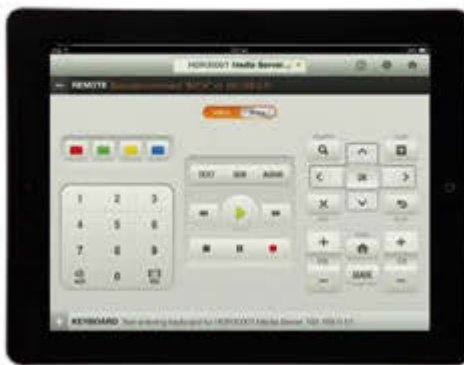
But there are two more significant advantages to this EPG. First, you don't have to worry about the EPG emptying out. With most PVRs if you have 'series recording' enabled, you have to make sure it does in fact switch on to that broadcaster from time to time so as to replenish the EPG data. The Humax HDR-3000T automatically fills its EPG periodically for all the stations, even if they haven't been viewed.

There are, of course, competing IP EPGs. One is a subscription product. The Humax one is free. The other is FreeviewPlus. The Humax also has this built-in should you wish to use it. I would note that as provided on this unit, FreeviewPlus was no more sluggish than usual. Indeed, it was verging on usable.

There's a third advantage of the IP EPG: 'Remote Recording'. You can go to the myhumax.net website and register your PVR (it will generate a registration code, and it's free), and then the site and your PVR will communicate. You can use the site's EPG from within any web browser — from anywhere, you don't need to be on your own network — to see what recordings are set up on your PVR, and to add new ones. Your PVR checks in from time to time and updates its recording schedule.

The series recording function, whether you're programming the unit directly or via the website, is very well integrated into the unit, not a mere afterthought. If you're watching a programme you'd like to record, or spot something in the EPG, you press 'OK' on the remote (twice if you're watching live) and full programme information pops up, along with options to record the current show or, by default, 'Record Whole Series'.

Playback was solid. Series recordings are grouped together so the Recordings screen is more orderly than is often the case. If you interrupt playback part way through, when



you next return you have the opportunity of resuming or starting afresh.

Fast forward and rewind speeds of 2x through 64x are available, along with extremely fast scooting around the file by holding down the left and right arrow keys. Pressed once, the arrow keys jump by an amount which can be set separately for each: 7, 15 or 30 seconds for jumping back; 30, 60, 120 or 240 seconds for jumping forwards. You can pause playback but there was no apparent slow-mo or frame-stepping function.

Networking

The network features are remarkably mature. There are apps (and an app store) that look like they're from one of the giant TV brands, and navigating through these is at least as snappy as with any of those. Among the apps — which include YouTube, Quickflix, SMH, TV, Twitter, Facebook and the SBS and ABC catch-up services (also available via FreeviewPlus of course) — is an Opera TV Browser. The unit supports a USB keyboard and mouse, although Opera was a bit clunky in its use of these.

Another unusual feature for a PVR — there are iOS and Android apps for various functions of this unit. The 'TV Remote' app is neatly organised, with simple and advanced layouts allowing you to operate all the functions of the unit. It has a keyboard as well for those times when you need to enter text.

The 'TV Live' app can be used to remotely program recordings on the unit, or to play them back, or indeed to watch live TV served up by the PVR. Aside from a slightly wonky aspect ratio on my iPad Mini, these all worked very nicely indeed. There was a five-second delay in the live TV shown on the iPad connected to the same network.

There is strong support for network media. The manual understates matters somewhat, suggesting that the unit will only play MP3 files. In fact it worked with FLAC, even high resolution music, although not with iTunes-style MP4 music. With high resolution FLAC, the unit was apparently able to pass

Various apps are available for the Humax on iOS and Android, including a full remote control, which usefully includes text entry.

through anything up to 96kHz to its HDMI output. (A 192kHz test track was converted to 96kHz, so I figure it dropped every second sample.)

The network video support was strong, with fine streaming of a range of MKV files, plus my usual collection of old MPEG2 ones. Also supported are MP4, VOB, AVI and ASF. As always, there are no guarantees in the confused morass of video and package standards or non-standards. The audio from my Android phone videos would play, but not the picture. Some of my camera videos wouldn't work at all.

Recordings made by the unit could be downloaded via FTP, or indeed directly copied from the unit's hard disk over the network using Windows Explorer or Finder on a computer on the same network. Transfers proceeded at around 10 megabytes per second. You can also copy media to a special 'Download' folder on the unit by FTP or simply by dragging and dropping to that folder from a PC/MAC on the same network.

Conclusion

So while the Humax HDR-3000T PVR looks on the surface like a kind of entry-level PVR, there are plenty of extras here which make it well-priced given the feature set unique to the brand. Its brilliant EPG alone suggests that if you're a keen watcher of TV series, this must surely be a PVR for your shortlist. *Stephen Dawson*



SPECS

Humax HDR-3000T PVR \$449

Tested with firmware: AUTFAD 1.00.25

Warranty: 24 months

Outputs: 1 x HDMI, 1 x composite video, 1 x stereo analogue audio, 1 x optical digital audio, 1 x aerial loop out

Inputs: 1 x aerial for Digital TV reception

Other: 1 x RJ45 Ethernet, 2 x USB (host type), USB WiFi dongle included

Hard disk: 500GB

Dimensions: 280 x 48 x 200mm

Weight: 1.03 kilograms

Contact: Humax Australia

Telephone: 1300 737 937

Web: www.humaxdigital.com/au



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Beyonwiz T4

personal video recorder

Ten from Four

The new Beyonwiz T4 PVR can use its four tuners to record up to 10 shows at once.

Not much more than a year after Beyonwiz released its T3 Linux-based PVR, it has followed up with the Beyonwiz T4, which is even higher powered than the T3, with four HD tuners built in and the ability to record many, many programmes at the same time.

Equipment

In brief, the Beyonwiz is a high-definition set-top box with the ability to record from up to four different 'networks' at the same time. That is, you can record SBS, ABC, WIN/Nine, and Prime/Seven, all at once — and at least two programmes from each at the same time, up to a quoted total of ten simultaneous recordings.

As with the T3, the T4 comes in a range of different, well, 'sizes'. That is, there is a choice of five hard-disk sizes, up to 6GB (\$1099), or indeed, down to one without any hard disk at all (\$599). Since they come with both USB and eSATA connections, even the disk-less one can record to an external drive.

The T4 has shed the SCART connections carried by the T3, which is probably just as well because that provides more room on the back for the four aerial inputs and four aerial loop outs. Three short jumper leads are provided so that you can daisy-chain them together. If you're in a weak signal area, then you can install extra antennas so that there's no splitting of the signal strength.

There's an Ethernet connection (or Wi-Fi with the optional USB adaptor). Output is via HDMI, but component and composite video and analogue and optical digital audio are also supported. There's also an HDMI input for recording from an external device or to use with the PIP function.

Most PVRs have a very basic front display; some have none at all. But the T4 has a nicely informative OLED one, with tasteful pale blue lettering. It shows very clearly what's going on, including the name of the station and programme that you're watching. Two display options are built in, and more are being developed by enthusiasts in an example of the kind of openness that is possible since the unit runs on the Linux operating system — obviously with plenty of media extensions and tweaking for its primary purpose as a PVR. It's powered by a twin-core 1.3GHz processor, making it significantly faster with many functions than the T3.

The supplied infrared remote control can be set to control many brands of TVs. Included with the unit is a three-month subscription to the IceTV online EPG and control service.

Performance

Once we plugged in the unit and switched it on (there's a hard-wired power switch on the back), it quickly fired up and started a wizard to tune in all four tuners, set the time and set up our network. The whole thing only took five minutes.

During our use of the unit it twice notified us that firmware upgrades were available. It was able to download these from the internet and install them automatically, only taking about ten minutes each time.

We just daisy-chained all the aerial connections together and plugged this up to the five-way splitter from our outside antenna, and all recordings — even when we forced it to employ all four tuners — were performed perfectly. There are menu options to show you detailed reception information, but most of what you need to know is shown

SUMMARY

Beyonwiz T4

personal video recorder

Price: \$699 (500GB HDD);
also no HDD \$599, 1TB \$749,
2TB \$799, 4TB \$949, 6TB \$1099

- + Four tuners, ten simultaneous recordings!
- + Stable performer with fine picture quality
- + Excellent network functions

- May have to re-memorise channel numbers if you purge unused ones



Detailed programme and technical information, as well as various other Beyonwiz features stemming from its Linux base, will continue to endear the brand to 'geek' users.

on the information panel which displays when you first switch to a channel or when you press 'OK' on the remote. This information panel also shows quite detailed information about the current programme, including its resolution (did you know that one of the free-to-air advertising channels uses 352 by 576 pixels, rather than the usual 720 by 576?).

By default pretty much everything was switched on including the time-shift feature, which allows you to pause live TV or rewind (cool feature: the time-shift buffer can be saved as a recording). The one setting we felt important to adjust was the pre- and post-recording buffer settings, which were too low at just a few minutes. We like five minutes before and 30 minutes after the programme in order to be confident of getting the end.

And with this PVR, you might as well be generous with buffers, because you will rarely run out of recording capability. We found that the T4 could actually do *more* than ten recordings simultaneously, although it then became a little sluggish in responding to commands. When we got to lucky 13 it became completely unresponsive; we switched it off with the hard switch and on again to find those recordings hadn't worked. So we'd suggest sticking to the official ten for safety.

If you have another PVR from the same family (e.g. a T3), you can use the network connectivity to watch a fifth network on your T4 using one of the tuners in the T3... even while the T3 is tuned into a different station.

You can also have the T4 log onto any shared folder on your network and make its recordings there, rather than on its internal hard drive (if it has one — this seems especially handy for the barebones model). Indeed you can have a bunch of different recording locations, save them all as 'Favorites' and relatively easily switch between them.

Playing back was smooth and reliable. Subtitles were available on playback. There are plenty of smoothly operating fast-forwards and rewinds speeds, up to 128x, and up to five pairs of forwards/reverse skip pairs with individually set-able jump times for each. There's also a fast scan if you hold down the arrows. Getting around your recordings presents no problems.

A useful 'Similar Broadcasts' feature will search the EPG for similarly-named programmes and present a list. There is series recording of course, with quite detailed settings available. You can also hit a key to have the unit query the Internet Movie

Database for information on shows, including the viewer star rating.

The picture quality was excellent, with good motion-adaptive deinterlacing so that free-to-air TV is presented in the best possible quality. Output resolutions from 576i/50 to 1080p/50 are supported.

There's a nifty PIP feature, and this even works with the HDMI input. A Blu-ray player we tried didn't work with that input, regardless of the output resolution we set, but we plugged in an old Beyonwiz PVR and it worked fine through the T4, both full screen and in the PIP window. We were able to successfully record it as well. We doubt that this will work with copy-protected material, but the sheer fact of being able to record any HDMI at all is a feature quite new to us.

One issue: you can edit the station lists to eliminate the duplicates. But that causes the renumbering of all subsequent stations, so the usual numbering that you're used to when keying in stations may be upset.

There are lots of network features, with the ability to add more. These include in the standard machine a Gmail reader, the Opera web browser, Flickr, an app for web cams, Last.FM, SHOUTCast and YouTube. Plus the unit will serve as a DLNA server (for photos and music only) and DLNA client (for photos, music and video).

And much to our surprise, in addition to the regular array of MP3 and AAC music, the unit would stream FLAC from our network, even up to 192kHz, 24 bits.

Although it won't serve up video via DLNA, we were able to dial into the T4's hard disk using our Blu-ray player, find the files containing the recordings, and play them, because all the folders are shared on the local network. If you have another T4 or T3 they can access each other's recordings over the network.

If you've had any experience in transferring recordings from a PVR to your computer, perhaps to edit for more convenient viewing, then you'll have needed a patient temperament; the large files can take an age to transfer. The T4

is the first PVR we've seen to pack Gigabit Ethernet. We used FTP to transfer a two-hour HD recording — 8.79GB in size — in 190 seconds, for a throughput of about 47 megabytes per second. That's nearly five times the speed we're used to from PVRs, and a respectable half what we get moving big files directly between our NAS and computer.

It turned out we didn't actually need FTP. We eventually noticed that the T4 had made an appearance on the list of network resources in Windows Explorer. A couple of seconds of clicking around and we found the 'movie' folder which contained all the recordings. No need for the web interface, nor for FTP, we could just drag and drop files to our computer.

You can also download recordings from the web interface, somewhat more slowly. The web interface allows excellent control over the unit, plus the capture of screen grabs.

Conclusion

Beyonwiz has taken what was already a strong performer, the T3 PVR, and upgraded it with a more powerful processor and an extra tuner, providing a strong, stable PVR. Just pick the 'size' that you want. *Stephen Dawson*



SPECS

Beyonwiz T4 personal video recorder

Prices: \$699 for 500GB HDD as tested; also no HDD \$599, 1TB \$749, 2TB \$799, 4TB \$949, 6TB \$1099

Tested with firmware: 4/3.14.2

Inputs: 4 x aerial for Digital TV reception, 1 x HDMI

Outputs: 1 x HDMI, 1 x composite video, 1 x stereo analogue audio, 1 x component video, 1 x optical digital audio, 4 x aerial loops

Other: 3 x USB, 1 x Ethernet, 1 x e-SATA, 1 x RS-232C

Storage: 500GB hard disk (see price options)

Dimensions (whd): 380 x 67 x 240mm

Weight: 2.5 kilograms

Warranty: 12 months

Contact: Digital Trading Co

Telephone: 02 9603 1822

Web: www.beyonwiz.com.au



Flow to Go

LG H4

Music Flow portable speaker

LG's wireless multiroom system gets a portable addition.

SUMMARY

LG Music Flow H4 (NP8350)

Wi-Fi/Bluetooth speaker
Price: \$259

- + Good sound for the size
- + Bluetooth and Wi-Fi streaming to high-res
- + Google Cast-ready
- + Multiroom capable

- Google Casting didn't work with our devices



You can read last issue's full LG Music Flow system review on www.avhub.com.au

Last issue LG's Music Flow system performed well among our massive test of wireless multiroom systems — the system combines network and online streaming up to high-res levels, plus point-to-point Bluetooth, and a control app which proved simple but effective. (Our full review is on AVHub.com.au.)

LG has now launched new Music Flow products including a soundbar and this little H4 speaker, which can connect by Wi-Fi to your network. It then streams music from your own network shares, from Spotify, Deezer and TuneIn (subscriptions required for the first two). And new to Music Flow is Google Cast compatibility — Google Cast will allow network streaming from apps including Google Music, Rdio, Pandora and others, avoiding the need for a Bluetooth connection.

The little H4 may remind many of the little Bose SoundLink Mini — it has a similar size and form factor, though it lacks the Bose's neat charging base, so the mains lead trails a little inelegantly from the side, where you'll also find a minijack auxiliary input. Off the mains the internal battery offers a quoted 5.5 hours battery life when streaming via Bluetooth, a little less if you leave it on Wi-Fi.

For sound the little H4 packs dual racetrack-shaped 38 × 85mm opposed bass radiators, one firing forward, one back. These are unpowered, moving under the reverse energy from the stereo 38mm mid-treble drivers backed by a quoted 20W of power.

We were impressed again by the ease of connection here, using the Music Flow Player app to input our Wi-Fi password, getting the latest update (including GoogleCast ability) all in under 10 minutes. Connecting via Bluetooth is even quicker, of course.

The H4 worked perfectly network streaming under control of our iPad 2, even playing 24-bit/96kHz files from a NAS drive, perhaps slight overkill into a speaker so small! The latest version of the app seems to wait for instructions as to what network shares to index (under Settings/Music Library/Sync) rather than just getting on with it in the background; a sensible decision. We note also that WAV and AIFF files were indexed and playable but (on our system, anyway) didn't read artist metadata, so were listed by track name only.

All also worked well streaming Spotify, Tunein and Deezer within the LG app itself. We had no luck Google Casting, though — no Google Cast icon appeared on Pandora or Google play on either our iPad 2 or our 5th-gen iPod touch. Early days, perhaps.

Sonically LG has a good little speaker here — it is limited in size by its physical dimensions, but within that constraint sound is balanced and musical, and not lacking in a sense of bass; the rear-firing passive radiator enables a little bass tuning near to but not flat against a rear surface or wall. Switching to Bluetooth had a slight impact on clarity, at higher frequencies in particular, but you hardly notice it except switching in direct comparison.

A last trick — as with several rival multiroom systems, you'll be able to set up a pair of H4s as wireless rear speakers to work with one of LG's Music Flow soundbars.

With such access to multiple music services, the potential to expand into a larger multiroom system, a decent app and high-res streaming capabilities, with rechargeable battery operation and a good small speaker sound, all for \$279, it's impressive technology for the money! LG continues to stake a strong claim in the multiroom music revolution. *Jez Ford*

M A G I C A L M E R L I N



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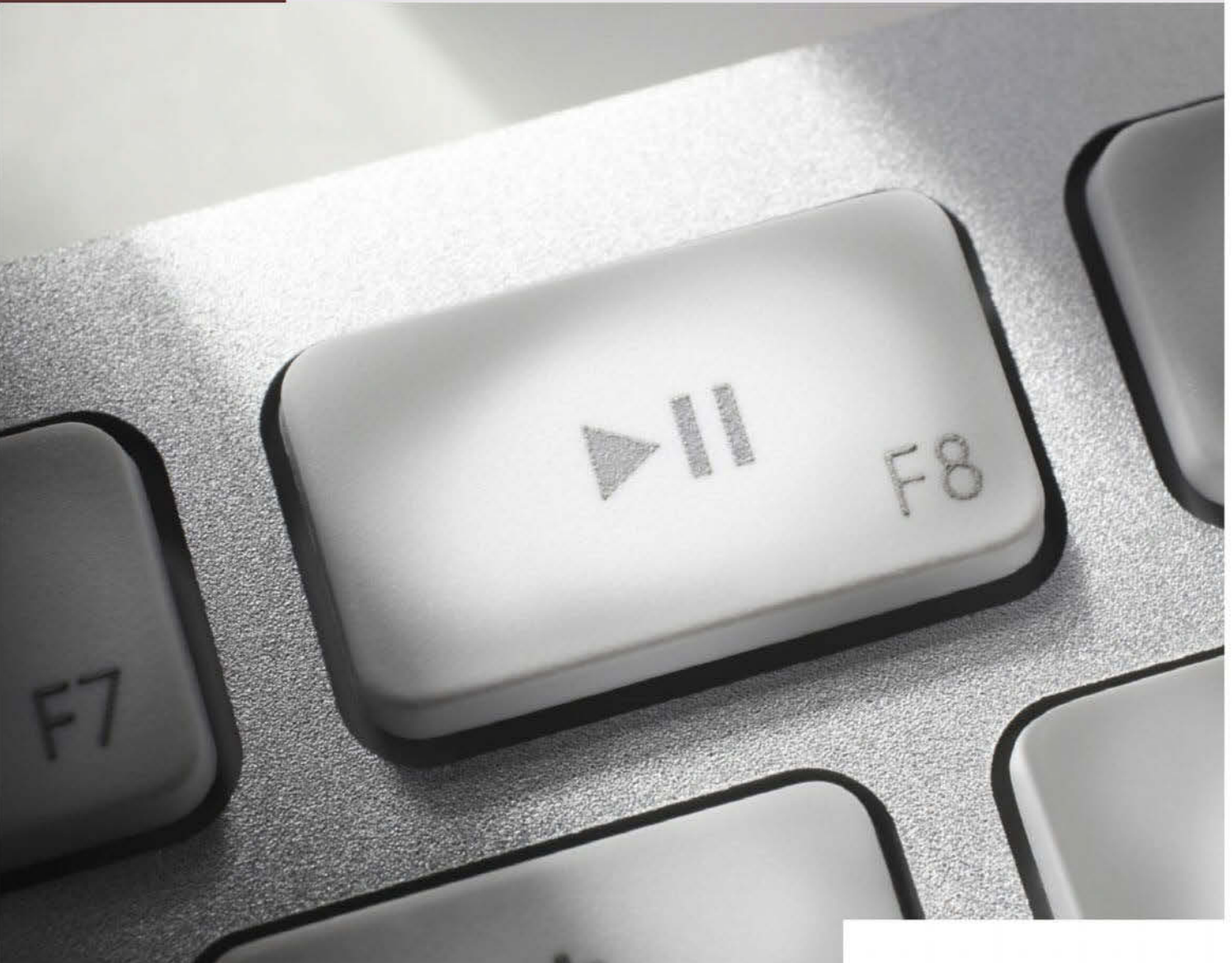
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Dirty Computers... Clean DACs!

+ Music collections have migrated rapidly to computer storage, but computers are not good audio sources in themselves. An offboard DAC aims to take your files and do a hi-fi job of converting them into music, ready for your hi-fi to play.

Today's music lover, and an enthusiast of high-quality reproduction in particular, may well have a problem. By now he or she is likely to have amassed a fair collection of favourite music on his or her computer. But a computer is far from an ideal source for hi-fi. The electromagnetic murk that constitutes the inside of a computer enclosure is not a fit and proper place for an analogue audio signal. And computers are invariably "built to a price", and sold on specs. The specs highlight speed, processing power, maximum gaming frame rates and so on. With very few exceptions, the audio chipset on the motherboard of the computer is simply not a priority. So, what to do?

“Don’t panic — the best of the breed are easy to use, almost plug and play, indeed. But it’s worth knowing their limitations...”

The answer, of course, is to take the audio out of the computer in the form of digital bits, and do the decoding to analogue in a dedicated device. It is those Digital-to-Analogue Converters (DACs) that we’re looking at here, reasonably priced ones in particular. You can spend many thousands on one if you are so minded.

Some of the DACs considered here also handle optical and coaxial digital audio input from CD or DVD transports or other digital sources. But for our purposes here we’re focusing on USB performance, other than to note that you could reasonably expect PCM performance to be comparable when delivered through those portals.

As for USB, there’s a key word that comes up with modern USB DACs: “asynchronous”. It’s stated as a virtue, although the word itself carries a vague sense of wrongness — wouldn’t one want a DAC to be synchronised with the computer?

In fact, no; not at all. Computer clocks are all nice and dandy, but not quite good enough to clock your digital audio. These DACs — as with all good modern DACs — are specifically designed to be *not* synchronised with their computer. The DAC has its own clock. It receives the audio data as packets and lines them up in the correct order and then decodes them according to its own timing. So long as the USB interface runs fast enough to ensure that there’s always data in the buffer, quality is dependent solely upon the DAC. Jitter (small timing errors) becomes entirely a function of the DAC, not the computer.

Check the stream

One very useful DAC feature which is far from universal (and may seem trivial) is something to tell you what signal the DAC is actually receiving. That might be using LEDs of different colours, or LEDs in different positions, or the text display provided by one of these DACs.

Why? Because computer audio can be a quite uncertain affair. Even when using a DAC with a Blu-ray player, you may have inadvertently left the PCM downsampling option to a position where 96kHz material is output at 48kHz. With computers, PCs and Macs often output a fixed sampling rate which may or may not match the actual specs of the music, particularly if it’s high resolution. Without intervention, a Mac will play everything at 44.1kHz, even if they’re actually 96kHz files.

There are ways around this with plug-ins and non-standard music players — VOX or Amarra on Mac, Foobar2000 on Windows, and many others, will change the output to match the files automatically. But it’s reassuring to glance at the DAC and see that it is in fact receiving the totally unnecessary 192kHz sampling rate of ‘The Velvet Underground and Nico’. If you have your settings wrong, you’re often unlikely to notice by sound alone.

Plug and play

When discussing DACs, it’s easy to get deep into the technicalities as you work out what’s going on in terms of conversions and formats. Don’t panic — the best of the breed are easy to use, almost plug and play, indeed. But it’s worth knowing their limitations, if they have any, to ensure the DAC you buy is going to do what you need, for your music collection.

With that in mind, let’s meet our three desktop DACs, followed by a pair of useful portable DAC designs..

FORMAT FRIENDLY? High-res audio, PCM & DSD...

HIGH-RES AUDIO

We’d say that support for high sampling rates is essential these days. Really, these days, 192kHz support is a necessity. Even if you are of the view that this is unnecessarily wide bandwidth for audio, you may end up with some music in this format and it would be nice to be able to play it back. One of the DACs looked at here also includes support for DSD (see below).

PCM & DSD

USB Audio has long been comfortable with PCM. It’s the bread-and-butter audio of the computer world. Even Windows will generally support up to 24-bit/96kHz audio via USB with built-in drivers in USB Audio Class 1.0. To go beyond that USB Audio Class 2.0 is required. This is not supported in Windows 8.1, or earlier (nor, it is rumoured, in Windows 10). So for 192kHz signals you will need to install a driver provided with your DAC. If you’re using Windows. Macs have supported USB Audio Class 2.0 for about five years, so no special driver is required (nor comes provided with any of these DACs).

But what about Direct Stream Digital? USB Audio Class 2.0 does not support it. Full stop.

A DSD WORKAROUND

But of course, there’s a workaround. It’s called DoP — DSD over PCM. This is not the same as converting DSD to PCM and then delivering that to the DAC. This is instead putting the DSD into a PCM ‘wrapper’ so your computer’s USB interface thinks it’s delivering PCM. The DSD-capable DAC, though, recognises it, and turns what appear to be series of PCM samples into a stream of bits, restoring the original DSD signal, which it then decodes as DSD.

How this is implemented depends on the software player you use. Many won’t do this at all. But there are players for both Mac and Windows that can pull off this trick.

I use Foobar2000 on Windows for most of my serious computer listening. This is highly versatile. It supports just about any driver. And it can be expanded in capability not quite infinitely by the addition of ‘components’, or what might be called in other contexts ‘plug-ins’. Indeed, if you don’t mind good old-fashioned DSD-to-PCM conversion, a component called ‘Super Audio CD Decoder’ will do just that.

But if you’ve also installed ‘ASIO support’ and the USB Audio Class 2.0 driver provided with your hardware supports DoP, then in the output/ASIO section you will find a driver called ‘foo_dsd_asio’. This is the thing that packs the DSD into a PCM container. You choose it as the output device. You double-click on it, and then choose the real ASIO device driver from there.

All this is a roundabout way to do things that are not yet supported by the main operating systems themselves. SD





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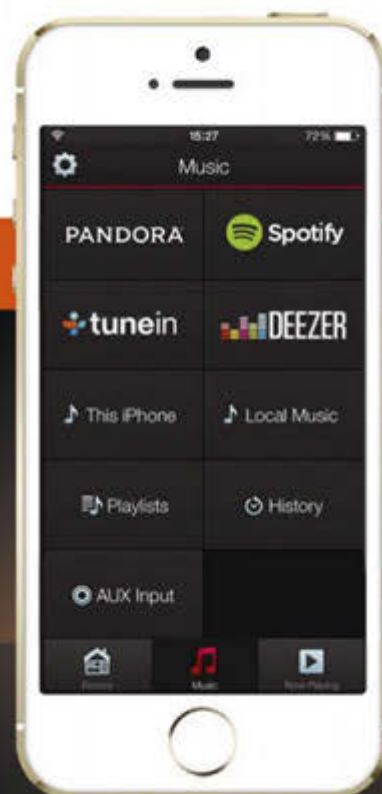
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Arcam irDAC

This UK-designed DAC is flexible and delivered excellent performance at the price from its USB connection.

SUMMARY

Arcam irDAC

DAC

Price: \$899

- + Extremely high quality sound
- + Flexible connectivity
- + Convenient remote control

- No sampling rate indicator
- No support for 176.4kHz
- No guidance in manual for best use

There isn't much one need say about Arcam other than that it's a famed British maker of mid to high-end audio equipment, and has been in the game for many years. The company presently has three USB-equipped DACs on offer, two in the company's ever-enlarging rSeries of DACs. The irDAC is its mid-priced USB-equipped unit.

Equipment

The irDAC is clearly more than just a USB DAC, with two optical and two digital audio inputs, plus a USB-A socket for plugging in iPods/iPhones/iPads in addition to the USB-B for connecting to a computer. A button on the top cycles through the inputs (or you can use the included IR remote). There are LEDs to indicate which input has been selected. A power pack means that you can use it for your CD or high resolution PCM disc transport without any need for a computer or USB connection.

It is all built into a fairly heavy metal box, finished in black, and unusually it comes with a remote control (thus the 'ir' in the model name).

There's a switch to change between USB Audio Class 1.0 and 2.0. Class 2.0 should be used if at all possible since it handles 192kHz sampling, unlike Class 1.0. Recent Macs support this natively. For Windows you'll need to install the special Arcam driver. Nonetheless, the Class 1.0 is a welcome capability since it means that you can use it with borrowed Windows computers without the need to add drivers. The unit uses the Texas Instruments PCM1796 DAC.

The manual was pretty light, telling you nothing much about driver installation, nor indeed how best to set up your computer to optimise performance. In fact, Windows users will need to download the driver from Arcam's website since it isn't provided in the box. (This came in a zip file which included the latest firmware for the DAC itself. It turned out that the DAC carried version 1.06 and the latest was 1.07. I followed the instructions and the upgrade went smoothly. I'm not sure how you go about it if you're using a Mac since it uses no special driver.)

The unit supports sampling frequencies up to 192kHz, except for

176.4kHz (admittedly fairly unusual). Unfortunately no sampling rate indicator is provided on the unit so you'll have to hope that you've got your computer settings right to ensure that the DAC is getting the best signal. You can use the driver control panel in Windows to check what's being output, or the Audio Midi Setup app on Mac. Still, a nice row of LEDs would be preferable.

Performance

I checked the Apple device connectivity with an iPod touch and an iPod Classic and it worked nicely. The DAC doesn't take over your device. You simply run its music player in the usual way and the audio will be delivered via the irDAC.

But our main focus was on use with computers. Driver installation on Windows went smoothly, and on a Mac the unit was instantly recognised. It offered ASIO, WASAPI and Direct Sound as audio devices visible by Windows on Foobar2000, and the ASIO and WASAPI performance was pretty much identical. Using bit-perfect music players with both Windows and Mac the sound was first class on everything from 44.1kHz up to 192kHz music (other than the unsupported 176.4kHz music, of course).

The remote provides convenient input selection. If you have an Arcam amplifier the volume and mute buttons will control that. There are also transport controls — jump track forwards and back, pause, play and stop — which will control your computer's playback software. These worked with both Windows (using Foobar2000 as the

player) and a Mac (using Vox and iTunes). With the Mac the play and pause buttons didn't work cleanly, but usually worked if you stabbed one immediately after the other.

There was one other slight operational difference between the platforms: the Windows driver had a setting which allows you to keep the audio stream on all the time. Without this, the DAC input switches into a neutral mode awaiting a signal (the source indicator goes red as well). When a signal is received, there's a quiet click inside and the LED goes green as the unit grabs the digital audio and gets to work. You can avoid this with the Windows driver setting, but an equivalent function wasn't obvious in the Mac set-up. That said, the response was fast and I heard no dropped phrases at the starts of tracks.

With 16-bit/44.1kHz signals the frequency response was exemplary (see graphs see p76), flat to 10Hz and down by a mere 0.1dB at 20,000Hz, falling away very rapidly above that. The noise floor measured at -96.1dBA. This DAC was the best performer of the three main DACs in this issue for both THD and intermodulation distortion.

With 24-bit signals the noise floor was around -110dBA — 0.8dB worse with the Mac. THD and IMD remained extremely low. At 96kHz the response was again down by 0.1dB at 20kHz, around 0.45dB at 30kHz and 1.2dB at 40kHz. Going up to 192kHz sampling, the response simply continued on the same trajectory to be down by 2.6dB at 50kHz, 4.6dB at 60Hz and 7.0dB at 70kHz.

At all three sampling frequencies, it provided the most extended frequency response of the three desktop units. That said, I was surprised that none of the units were capable of a truly flat response out to 60 or 70kHz. Perhaps that requires a lot more money.

Conclusion

Regardless of that, the Arcam irDAC stands ahead of the others in terms of sheer performance. On top of that it has a well thought-out design, remote control convenience, and a way of extracting the best possible quality sound out of your Apple music player.

Stephen Dawson



SPECS

Arcam irDAC

\$899

Inputs: 1 x USB-B, 2 x optical digital audio, 2 x coaxial digital audio, 1 x USB-A

Outputs: 1 x stereo line output (2 x RCA), 1 x coaxial digital audio

Digital formats: PCM @ 16/24 bit 32, 44.1, 48, 88.2, 96, 192kHz

Frequency response: 10-20,000Hz ± 0.1 dB

SNR: 112dBA

Dimensions (whd): 190 x 44 x 120mm

Weight: 1097 grams

Warranty: Two years

Contact: Sennheiser Australia Pty Ltd

Telephone: 02 9910 6700

Web: www.arcam.com.au

USB-A and digital output

The Arcam is the only one of the three DACs here to include a USB type A slot for direct connection of Apple smart devices, and the only one to include a coaxial digital output.

Class conscious

You can use a small switch to choose between USB Audio Class 1.0 and 2.0. Class 1.0 will require no drivers for Windows but is limited to 96kHz.

Input options

The irDAC is well stocked with inputs — USB-B for computer, USB-A for smart devices, two coaxial and two optical.





Denon DA-300USB

Denon brings its long experience of DAC design in amplifiers and receivers to a neat little standalone DAC & headphone amplifier.

SUMMARY

Denon DA-300USB DAC

Price: \$849

- + Very high quality sound
- + DSD support
- + Headphone convenience

- Imperfect for low impedance headphones
- No guidance in manual for best use

The Denon DA-300USB adds to its DAC functionality a headphone amplifier, with volume control and a proper 6.5mm stereo socket. Its USB DAC features also go above and beyond, including DSD support.

Equipment

This is an attractive device with a solid metal casing and black end panels. The front has the headphone socket, the volume control, a power/standby key and an elegant white-on-black OLED touchscreen display. The touching bit is only for changing the input selection. The rest of the display shows which input is selected, the format and sampling frequency of the incoming signal, and the level of the headphone output.

There are four inputs: two optical and one coaxial digital, plus the USB-B that we're mostly concerned with. Line output uses a pair of RCA sockets. The unit uses external power to operate.

The reason the unit indicates the signal format is that in addition to the usual PCM (from 32kHz to 192kHz,

including 176.4kHz), the unit supports via USB stereo Direct Stream Digital at both 2.8 and 5.6Mbps sampling. DSD is the SACD audio format, and over the last couple of years it is becoming a modestly popular format for high resolution downloads.

The unit is USB Audio Class 2.0 only, so it requires a driver for Windows, which you have to download from Denon's website (even though the unit comes with a CD upon which the main user manual is provided). No special driver is required for Macs, which support Class 2.0 natively.

The Windows driver provided both ASIO and WASAPI direct connections to hardware, in addition to plain Windows Direct Sound (which is far from direct).

When plugged into a Mac, the device name doesn't come up as Denon, but as 'USB High Speed Audio'. This seemed to be a generic driver which hadn't been properly informed by the DAC as to its capabilities, since among the audio formats it offered as possible selections was 352,800Hz PCM — which the Denon DAC does not support.

The instructions suggested a standard Windows set-up with the output locked to 192,000Hz. That means Windows will upsample all your music in software, which may reduce quality. Far better to send the original bits to the DAC and have it do the work.

Nor does Denon offer any guidance as to how to set up the unit for DSD operation. How hard this will be depends on the player software you use. Many apps don't support DSD at all. Foobar2000 does, but setting it up requires installing a couple of 'components' and choosing some output options in the preferences. Audiophiles using Foobar2000 will be familiar with the installation of components.

The unit by default switches itself off after 30 minutes without a signal. You can set it to remaining on permanently.

Performance

This is a highly usable and highly enjoyable DAC. It sounded great both delivering at line level to my main system, and using a couple of different sets of headphones connected directly to it. It was detailed and smooth, and it was clearly capable of driving the headphones cleanly well beyond the point of hearing damage. My headphones are fairly high in sensitivity, but there was still plenty of gain left when they were poundingly loud to suggest that lower sensitivity headphones would still be very happy.

The DSD feed worked extremely well, with great detail, on the standard 2.8MHz files. With DSD 5.6 the music was submerged in a mist of static. It was there, but unlistenable. I fiddled with all the settings in the multilayered drivers to

no avail. It could be some incompatibility in the file, some limitation in the USB of my computer, or something unknown.

With standard 16-bit/44.1kHz inputs the performance was good, with a nice low noise floor (-96.2dBA) and a smooth response. It was flat down to at least 10Hz. At the top the unit clearly employed a slower filter than is often used, starting to bend down at 16.5kHz and rolling off to be down by 1.65dB at 20kHz (see graphs, p76).

The theme was similar with 24-bit/96kHz PCM. The noise level measured at -110.7dBA, and again a slow filter was apparent, with the response down by 0.75dB at 20kHz, 1.75dB at 30kHz, and 3.5dB at 40kHz. This isn't a limitation of the analogue stage, because while there is again a slow filter with 192kHz signals, the curve is quite different. At 192kHz the output was still above -3dB at 50,000Hz. Denon's engineers have clearly chosen the slow filter intentionally.

The headphone output was a mixed bag. I use two measurement loads: 552 ohms (which is probably higher than most high impedance headphones) and 32.6 ohms (also a bit higher than really low impedance headphones). This unit will really pound out the sound if you rotate that knob clockwise. Delivering full-scale sine waves at 100Hz, 1002Hz and 10kHz, the unit was good for 30 undistorted milliwatts into 552 ohms (that's about 15dB above the rated headphone sensitivity) and around 58mW (17.6dB) into 32.6 ohm loads.

Actually, in the latter case that output was only available at 1002Hz and 10kHz. At 100Hz this fell back to 13.65mW

because at the lower impedance, the response rolled off in the bass. At 50Hz it was down by 1.5dB, and at 20Hz by 5.7dB. In addition, the overall output even at mid-frequencies was 9.5dB lower into 32.6 ohms than into 552 ohms. I was able to calculate the apparent presence of a 78.9-ohm internal impedance in the unit's output stage. This is surprising headphone amplifier design.

Conclusion

But with my middling impedance headphones I didn't notice the bass fall-off. Instead I just enjoyed the high-quality sound produced by this unit, particularly at its line outputs, as reproduced by my sound system. *Stephen Dawson*



SPECS

Denon DA-300USB

\$849

Inputs: 1 x USB-B, 2 x optical digital audio, 1 x coaxial digital audio

Outputs: 1 x stereo line output (2 x RCA), 1 x 6.5mm headphone

Digital formats: PCM @ 16/24-bit 32, 44.1, 48, 88.2, 176.4, 96, 192kHz, DSD64 & DSD128 via DoP

Frequency response: 2-96kHz/2-20kHz $\pm$ 0.5dB (192kHz PCM); 2-100kHz/2-50kHz - 3dB (192kHz PCM)

SNR: 112dBA

Dimensions: 170 x 57 x 182mm deep

Weight: 1509 grams

Warranty: Three years

Contact: Qualifi

Telephone: 03 8542 1111

Web: www.qualifi.com.au

Ins and outs

Denon's DAC offers two optical and one coaxial digital input in addition to the USB-B socket for connecting your computer. In addition to the line-level analogue RCA sockets at the rear for connecting to your hi-fi, the Denon has a full-sized headphone jack and volume knob on the front panel.





SilverStone EB01-E

While it does rather less than its rivals here, the lower price and still solid performance of the EB01-E indicates the value available from USB DACs.

SilverStone Ensemble EB01-E DAC

Price: \$356 (varies with supplier)

- + High quality sound
- + Needs no power supply
- + Excellent value for money

- Disappointing high frequency response on high resolution files
- No sampling rate indicator
- No support for 176.4kHz PCM

SilverStone is a Taiwanese company best known for high-end computer parts, especially aluminium cases for HTPCs and the like. But it also designs and builds electronics, and its 'Ensemble' series consists of three products: the DAC under review, a similarly styled headphone amplifier, and an aluminium headphone holder.

Equipment

The SilverStone EB01-E is a solid device, beautifully constructed from substantial aluminium plates. The sculpted front presents a very attractive face, with two hidden LEDs at its right side, the reflected glow indicating the unit's power status and whether music is being played. There are no sample rate indicators.

At the rear is a USB-B input, plus optical and coaxial digital audio inputs. A small press-button cycles through these three, and a pair of RCA sockets provides analogue output. There is no power input because the unit runs entirely off USB power — so even if you're feeding it via optical or coaxial, you're going to need to plug it into a USB power source. It also

comes with a short adaptor cable: two RCA plugs to one 3.5mm stereo socket for use with headphones.

The unit uses a Texas Instruments PCM1798 DAC chip, its output handled by a Texas Instruments NE5532 op amp. The USB decoder is an XMOS XS1 TQ128 (your computer will see the device as 'XMOS').

This unit operates in USB Audio Class 2.0 alone, so for Windows computers you must install the provided device driver. For Macs from recent years, no additional driver is required or available (even though the manual strangely suggests one should be installed).

That Windows driver comes on a mini-CD. I checked to see if there was an update on the SilverStone website and the only one shown there was specified as being version 1.0. Since Windows reported the installed driver as already being version 2.10.0.0, I just left it alone! On Windows the driver supports operation with the default Windows audio system, and also with exclusive-mode WASAPI and ASIO. The latter two cut out the audio processing built into Windows, allowing your music player

software to take over the DAC so that each bit in the audio file will be delivered unaltered to the DAC.

Aside from being misleading on the issue of Mac drivers, the manual's suggestion for setting up your Windows computer is less than optimal. It says that you should set the output to 192,000 hertz at 24 bits in the Windows audio control panel. Perhaps, if you insist on using basic player software which relies on these Windows settings. Unfortunately the Windows resampling from 44.1kHz to higher resolutions is thought to be somewhat substandard. Far better to use software which speaks directly to the DAC driver, allowing bit-perfect audio delivery. With the drivers installed, Foobar2000 gave me four options: ASIO, two kinds of WASAPI, and Direct Sound (i.e. the standard Windows audio system).

Performance

I spent a lot of time listening to music using this DAC, with it decoding for both a PC and a Mac. It produced a lovely clean sound, with excellent detail and no discernible noise. It ran smoothly on all my high resolution files — up to 192kHz. However it does not support 176.4kHz (admittedly fairly unusual). The results were also excellent with the bulk of my music collection which is, of course, in good old CD-equivalent 44.1kHz, 16 bits.

There was one slightly off-putting aspect to the sound, the cause of which took several minutes to determine. It turned out that the unit was swapping the left and right channels. The red RCA output marked 'R' is in fact the left channel, while the white one marked 'L'

is, of course, the right channel. If you use the headphone adaptor, the result is the same: the channels are reversed. So just switch things around: plug red into white, and white into red.

Normally with a device in which headphone output is clearly intended to be used, I'd check performance. But with this unit not having a dedicated volume control you must use your player software's volume control to adjust level, and that means that the data is being recalculated by the computer — the DAC is no longer receiving the original signal. It sounded okay, with a reasonably high output and sufficient oomph to deliver bass. But SilverStone has a companion headphone preamplifier available — with a volume control — if you want to go that route.

The measured performance was mostly good stuff (see p76). This included a frequency response on 16-bit/44.1kHz material that was flat to 10Hz, and 0.3dB down at 20kHz, with an overall noise floor of -95.7dBA. Distortion was low. Stereo crosstalk was low.

With 24-bit/96kHz and 24-bit/192kHz signals, the overall performance was much the same except for reduced noise floors (107.4dBA using a Mac and 108.5dBA with a PC) and more extended frequency responses, although not as extended as I would have expected. With 96kHz the output was down by 0.5dB at 20kHz, 1.6dB at 30kHz and 3.6dB at 40kHz. With 192kHz sampling the roll-off continued: down by 7dB at 50kHz, 10.8dB at 60kHz, and more than 15.0dB at 70kHz.

These are certainly not end-of-the-world figures, but nonetheless it is a

little disappointing that the unit doesn't take any particular advantage of the bandwidth inherent in 192kHz material.

The good news, though, is that while 192kHz might not yield performance improvements, the mere fact that this unit can handle the signals means you don't have to downsample your 192kHz stuff for playback.

Conclusion

Keep in mind the price here — the SilverStone EB01-E is less than half the price of the DACs here from more established audio companies. And there is no doubt that it will offer technical and audible quality advances over the audio hardware built into just about any computer. *Stephen Dawson*



SPECS

SilverStone Ensemble EB01-E DAC \$356

Inputs: 1 x USB-B, 1 x optical digital audio, 1 x coaxial digital audio

Outputs: 1 x stereo line output (2 x RCA)

Digital formats: PCM @ 16/24 bit 32, 44.1, 48, 88.2, 96, 192kHz

Frequency response: Not stated

SNR: Not stated

Dimensions (whd): 152 x 42 x 156mm

Weight: 673g

Warranty: One year

Distributors: various

Web: www.mittoni.com.au

Case in point

The company's core expertise in aluminium case-work shows in the quality of the EB01-E's chassis.

Ins and outs

The Silverstone keeps it simple, with one each of optical and coaxial electrical inputs, and the USB-B socket for connecting to your computer.

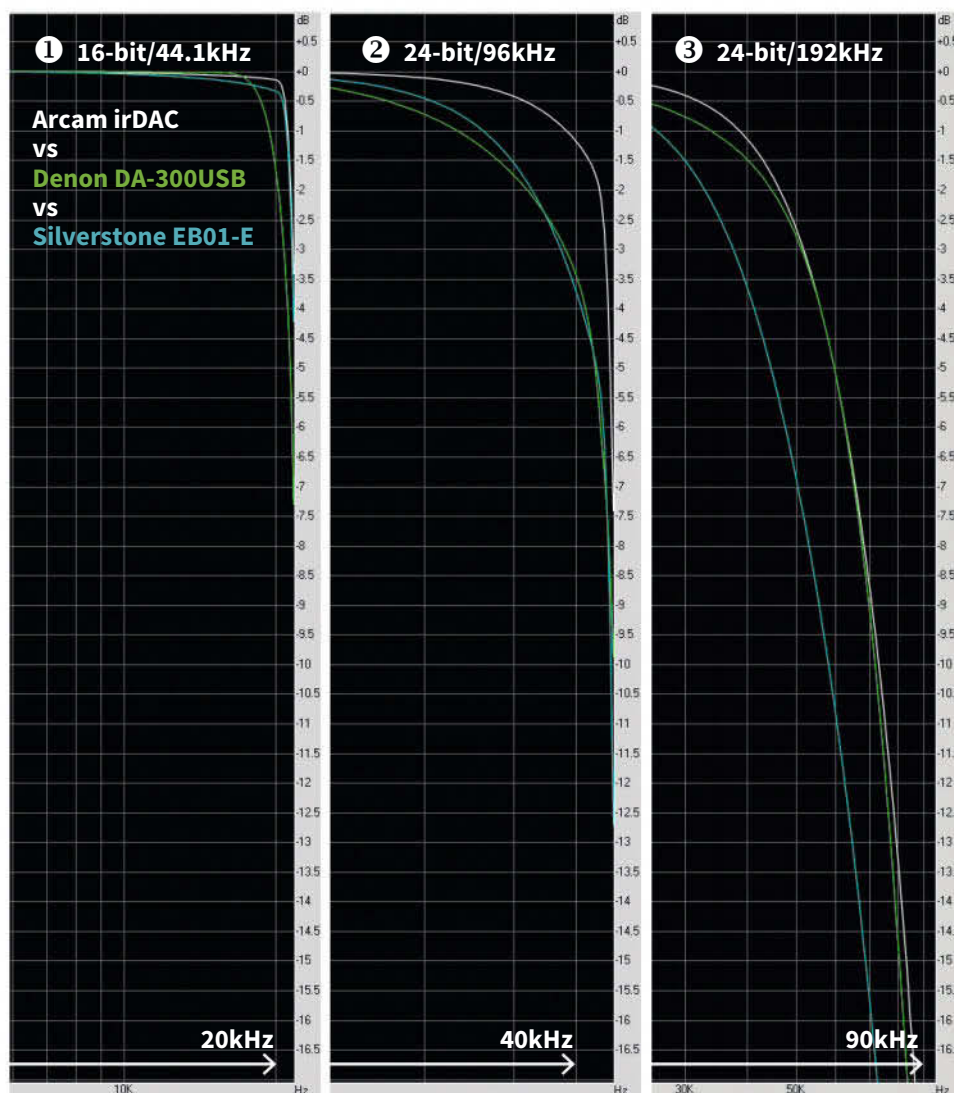
USB power

The EB01-E has no external power supply, so you need USB connected even if your signal is coming via coaxial or optical inputs.



group test

USB DACs



MEASUREMENTS

Arcam, Denon & Silverstone DACs...

ARCAM irDAC

With 16-bit/44.1kHz signals the Arcam's frequency response was exemplary, flat down to 10Hz, and down by a mere 0.1dB at 20,000Hz, falling away very rapidly shortly above that. At 96kHz the response was again down by 0.1dB at 20kHz, around 0.45dB at 30kHz and 1.2dB at 40kHz. Going up to 192kHz sampling, the response simply continued on the same trajectory to be down by 2.6dB at 50kHz, 4.6dB at 60kHz and 7.0dB at 70kHz. At all three sampling frequencies, the Arcam provided the most extended frequency response of the three desktop units.

DENON DA-300USB

With standard 16-bit/44.1kHz inputs the performance was good, with a nice low noise floor (-96.2dBA) and a smooth response. It was flat down to at least 10Hz. At the top the unit clearly employed a slower filter than is often used, starting to bend down at 16.5kHz and rolling off to be down by 1.65dB at 20kHz. The theme was similar with 24-bit/96kHz PCM, a slow filter again apparent, with the response down by 0.75dB at 20kHz, 1.75dB at 30kHz, and 3.5dB at 40kHz. This isn't a limitation of the analogue stage, because while there is again a slow filter with 192kHz signals, the curve is quite different. At 192kHz the output was still above -3dB at 50,000Hz. Denon's engineers have clearly chosen the slow filter intentionally.

SILVERSTONE EB01-E

The measured performance was mostly good stuff. Frequency response on 16-bit/44.1kHz material was flat to 10Hz, and 0.3dB down at 20kHz. With 24-bit/96kHz and 24-bit/192kHz signals, the overall performance was not as extended as I would have expected. With 96kHz the output was down by 0.5dB at 20kHz, 1.6dB at 30kHz and 3.6dB at 40kHz. With 192kHz sampling the roll-off continued: down by 7dB at 50kHz, 10.8dB at 60kHz, and more than 15.0dB at 70kHz. Keep in mind the price here.

MEASUREMENT NOTES

The measurements mentioned throughout these reviews required the use of an analogue-to-digital converter, so they include some degradation of the signal imposed by the equipment used: a Focusrite Forte ADC, and the analogue cables and adaptors connecting the DAC to the ADC. In particular, this led to reduction in the signal level of 0.19dB at 20Hz, and 0.59dB at 10Hz. In other words, a roll-off at the bass end is evident in the graphs taken largely due to the measurement apparatus, so the graph sections shown on this page show only the upper frequencies, where the testing apparatus was good to 0.1dB above 40,000Hz and good to 1dB to above 65,000Hz. The -3dB point was just under 80,000Hz. Where measurements in those upper reaches are mentioned in the main articles, they have been adjusted appropriately.

	ARCAM irDAC	DENON DA-300USB	SILVERSTONE EB01-E
① 16-bit/44.1kHz			
Noise level, dB (A):	-96.1	-96.2	-95.7
Dynamic range, dB (A):	96.1	96.2	95.8
THD, %:	0.0011	0.0018	0.0032
IMD + Noise, %:	0.0045	0.005	0.0059
Stereo crosstalk, dB:	-97.0	-97.5	-96.7
② 24-bit/96kHz			
Noise level, dB (A):	-110.0	-110.7	-108.5
Dynamic range, dB (A):	110.0	110.5	108.4
THD, %:	0.0012	0.0015	0.0054
IMD + Noise, %:	0.0015	0.0024	0.007
Stereo crosstalk, dB:	-108.4	-108.4	-107.4
③ 24-bit/192kHz			
Noise level, dB (A):	-110.0	-110.6	108.5
Dynamic range, dB (A):	110.1	110.6	108.5
THD, %:	0.0012	0.0014	0.0061
IMD + Noise, %:	0.0015	0.0022	0.0073

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USB DACs



AudioQuest DragonFly 1.2 & Cambridge Audio DacMagic XS

portable USB DACs

Portable DACs

Two tiny DACs for your computer, both also operating as headphone amps. Both proved remarkably high-quality performers.

Regular readers will know that these two tiny DACs both feature in our current Sound+Image awards as recipients of our praise in the Portable DAC category. Our full reviews are published here for the first time. Both units aim at precisely the same task — plugging directly into a computer USB socket, requiring no other external power, and allowing a hopefully substantial upgrade in audio quality for a pair of headphones, compared with what you'd receive out of the computer's own most likely unaudiophile headphone socket. They can both also be plugged through at line level into a hi-fi. The two units therefore share some characteristics — but they diverge in others.

a largish USB stick. At one end is a USB plug, while the other houses a 3.5mm stereo socket. Inside is a '24-bit ESS Sabre conversion chip' (the model number isn't specified, although as AudioQuest notes, ESS DAC chips are presently very popular among designers of the 'better CD and Blu-ray Disc players').

There are no controls at all on the device. We'll talk more of volume control below. It supports the normal PCM signals, says AudioQuest, from 16 bits and 44.1kHz up to 24 bits and 96kHz. It operates only in USB Audio 1 mode, so there are no tricks. Plug it into any Windows or Mac, and the computer should automatically load suitable drivers and within a couple of minutes you'll be right to go.

There is however an indicator: the largish DragonFly emblem changes colour in operation (see images right), with five different options depending on the sampling frequency. It does look very pretty, and more importantly, it gives a clear indication that your computer is delivering the correct sampling frequency to the DAC.

As an extremely portable device, the DragonFly comes with a cap for protecting the USB plug, and a small leatherette pouch to protect it while you're travelling.

SUMMARY

AudioQuest DragonFly 1.2

portable USB DAC
Price: \$198

- + Compact and neat for travelling
- + Very attractive styling
- + Easy to use
- + Good quality sound

- Restricted to Windows driver's limited capabilities

SUMMARY

Cambridge Audio DacMagic XS

portable USB DAC
Price: \$229

- + Compact and neat for travelling
- + High quality sound
- + Easy to use
- + Excellent value

- Needs special Windows driver if Class 2 mode is selected

Equipment

AudioQuest is best known for its various audiophile cables, but has departed lately from that focus, just releasing a pair of headphones (the Nighthawks) and already gaining much recognition for this DragonFly miniDAC in its first incarnation — here we have what is called Version 1.2. It is a lovely little thing, not much bigger than

Showing their colours



^ AudioQuest's DragonFly glows red in standby, green for 44.1kHz, blue for 48kHz, amber for 88.2kHz, and magenta for 96kHz. The Cambridge has just a small LED — blue for 44.1/48kHz, green for 88.2/96kHz, magenta for 192kHz.

Cambridge Audio, meanwhile, has packaged its miniDAC into a slim, lightweight, brushed aluminium casing. One end of this has a 3.5mm stereo socket, the other a micro-USB socket. A short micro-USB to regular USB adaptor cable is provided to make the link to the computer, avoiding potential issues fitting its width into a line of occupied slots. As with the DragonFly, it is entirely powered by the USB socket.

Much of the work is done by the ESS Sabre ES9023 DAC it employs. This has an 'integrated 2V RMS driver' built in and apparently needs only passive components to make it deliver the goods.

The DacMagic XS supports up to 24-bit 192kHz audio. That should work out of the box with a Mac, once you've switched it to USB Class 2.0 mode. For Windows there's native support to 24-bit 96kHz. The installation of a driver from Cambridge Audio, along with switching to USB Class 2.0, is required for 192kHz.

Performance

Starting with the DragonFly, then, installation was trouble-free. I plugged it in, Windows put up a message saying it was searching for drivers, then that it was installing them, then that my new hardware was ready for use.

And indeed it was. I did a lot of listening before going all technical, and the music as delivered by this DAC sounded wonderful both on several different sets of headphones and when plugged into a proper analogue hi-fi.

As with all these things, since it does only PCM itself, your computer will do any decoding from other formats (such as MP3, WMA and so on). I used mostly FLACs, both high-res and CD-quality.

Because the AudioQuest uses the default Windows driver, you are

restricted to that driver's capabilities.

One of the things this seemingly lacks is support for 16-bit audio. Thus the standard Direct Sound audio formats available were 44,100, 48,000, 88,200 and 96,000 hertz all at 24 bits, not 16 bits.

Likewise, when I used Foobar2000 with the output set to 16 bits, an error message was returned. It had to be set to 24 to force the signal into compatibility with the driver.

Volume control of the DragonFly is made using whatever volume control your computer provides — there is no control on the device itself. Computers typically provide several volume controls, some of which are independent of each other, and some of which control one or more of the others. AudioQuest's 'Flight Manual' recommends you put your player software's volume control to the maximum and then, if necessary, adjust the volume level with the computer's overall system level. In Windows, that's via the little speaker icon in the System Tray, on many computers replicated with hardware controls with dedicated keys.

Does it matter? Well, here's the thing: there are various ways of adjusting the volume level at a technical level. The obvious way is to do a naive digital transformation, recalculating the value of each digital sample so it adopts its appropriate respective level in the new, overall lower, range. If this were done with 16-bit sound, then the resolution of the sound would be reduced once you're a few notches below full volume, leading to higher quantisation noise levels. That, presumably, is why the Windows driver insists on receiving 24-bit sound.

However AudioQuest says its system works in a different way. It says that when the volume control on the computer is adjusted, it does nothing



group test

USB DACs



“Just the kind of thing to keep in your travel headphones case so no matter what computer fate brings you, you can easily get high quality audio...”

advantages. The most obvious one is that you get support for 192kHz music. But there's a less obvious one as well — as we've seen with the AudioQuest, the standard Windows driver does not appear to support (at least when used with these units) 16-bit sound. So you rely on Windows or your player to convert 16 bits to 24, a very simple mathematical translation. The problem is that the DAC will have no reason to know that the source was originally 16 bits and therefore may not optimise performance for that bit depth. Class 2 USB is also claimed to reduce jitter.

Another possible advantage is that the Class 2 driver supports ASIO (Audio Stream Input/Output), which generally provides lower latency performance (i.e. reduced delay in sound). The driver also supports the Windows WASAPI interface with a suitable application. Using ASIO or WASAPI allows the original sample rates to go through unmolested to the DAC. A tiny LED at the headphone end glows a different colour according to the signal: blue for 44.1/48kHz, green for 88.2/96kHz, magenta for 192kHz.

There are 54 levels available for the DacMagic using the volume buttons, ranging from effectively silent to, as we shall see, thunderingly loud. I thought I'd check out how much of an effect each press of a button had, yielding rather odd results. Instead of changing the output by evenly-spaced decibel levels, it was all over the place. There was a trend, though: at the lowest levels each press of the '+' key upped the volume by 1.5 to 3 decibels. In the middle of the range it was around 0.6 to 1dB. At the top it fell to the low 0.4s.

Using the default Windows driver, the volume can also be controlled both by the computer system and by your music player. Using ASIO or WASAPI the computer's volume control (along with mixing in of system sounds) is cut

to the digital signal. Instead, it sends some kind of control signal through the DAC to the analogue domain volume control built into the DragonFly. Even when the iTunes volume slider is used, DragonFly's high-resolution analogue volume control carries out the instructions in the analogue domain for the best sound quality.

I don't have a lot of faith in the audio handling of Windows, so I was far from convinced that it would nicely just pass over the information required by the DragonFly without messing around with things. And there was no certain way to check that, since all the audio was being upconverted to 24 bits anyway by Windows.

If you're plugging the unit into a high quality system with its own volume control, AudioQuest recommends that you turn up the computer volume to the max, and use your audio system's volume control.

So far so good. Moving over to the Cambridge DacMagic, the choice between Class 1 and Class 2 initially

caused me problems. I plugged the DacMagic into my Windows 8.1 notebook, and while the drivers appeared to load normally, the DacMagic failed to appear as a Playback device. The Windows Control Panel suggested that it hadn't installed properly — something about incompatibility between driver versions. A couple of reboots, deinstallations and reinstallations failed to fix it.

From the packaging I clearly wasn't the first person to have laid hands on this particular review unit, so I thought that perhaps it was switched to USB Class 2 operation already. The manual (online, you have to download it) said that to switch between modes, you hold down both volume keys until the LED flashes either blue or purple. But the LED wasn't flashing.

I plugged it into my main computer (which runs Cambridge Audio's USB Class 2 driver for the DacMagic 100 I normally use), and the computer accepted it straight away, the LED started flashing normally and I could change it back to USB Class 1. When I then moved it back to the other computer, it worked immediately.

I mention all this because this apparent defect may happen to other users; you should be able to change mode even if the Class 2 driver isn't installed.

Having said that, we'd suggest using Class 2 and installing the Cambridge Audio driver on the computers you intend to use this unit with, for it confers some

group test

USB DACs

out. For bit-perfect delivery of the signal, you should set the music player's volume to maximum and control the level with the DacMagic's own volume control.

The figures you'll see below translated into actual music of wonderfully high quality through the Cambridge miniDAC — clean, controlled, noise-free and balanced as well as you could expect from any computer-based source. With four different sets of ear-wear, the results were uniformly excellent.

Measurements

Going back to the AudioQuest DragonFly, then, we used the RightMark Audio Analyzer test to begin measurements. Up at full volume the THD developed was relatively high at 0.011%, and the intermodulation distortion up around 0.022% (or 0.029% depending on the test used). These are 'Good' levels, but by no means particularly impressive. Reducing the computer volume to 78% (and thus the DragonFly's analogue volume) increased noise levels by a couple of decibels, but more than halved the THD (to 0.005%) and the IM distortion as well (to 0.010/0.013%), suggesting the output stage might be stretching a bit to reach those maximum output levels. I'd suggest turning the volume down to around three quarters, and then seeing if that's a nice balance of low noise and high quality sound.

The frequency response of the unit was good out to 40kHz at -1dB. Noise levels were around -102dB(A). We should note that measurements here also include any degradation of the signal by the Focusrite Forte ADC, and the analogue cables and adaptors connecting the DAC to the ADC. (See notes on p76.)

Applying headphone-like loads, the DragonFly was good for around 17mW of clean output into a 32-ohm load, and nearly 5mW into a 552-ohm load. In practice, the levels with all earwear likely to be used with a compact device were plenty high enough.

Moving to the Cambridge Audio unit, the noise levels were similarly insignificant at -102dB(A) and THD was below 0.008%. You aren't going to hear anything untoward here. The frequency response was even closer to flat here: -0.2dB at 20Hz and 30kHz, -0.4dB at 40kHz — measured with a 96kHz signal.

The output levels were tremendously high. With a high impedance load, such as an analogue input on an amplifier, you'll want to have the volume one notch down from the maximum in order to avoid some incipient clipping with full-scale material. That left the output

at 1.77 volts RMS, which is plenty to drive any system. Into a 32-ohm load the output was some 61mW, about twice what an Apple will deliver. It wouldn't surprise me if the unit could indeed deliver 150mW into a 12-ohm load. For high impedance headphones (552-ohm test load) the unit was still good for 1.7 volts output, which is again about 5mW (around two-and-a-half times the output of your favourite Apple music player).

Conclusion

When we did the awards, we said it was a close run thing between these two miniDACs; the Cambridge has advantages with its Class 2 driver, but both units were outstanding performers given their tiny size and high-value pricing. The AudioQuest DragonFly is a nifty, neat and highly portable DAC with very good performance — just the kind of thing to keep in your travel headphones case so no matter what computer fate brings you to in your travels, you can easily get high quality audio. Meanwhile we have almost no criticism of the Cambridge DacMagic XS at this price — unless you're a great fan of DSD, you aren't going to be disappointed with this nifty little performer. *Stephen Dawson*

SPECS

AudioQuest DragonFly 1.2 \$198

Firmware: 5325-1581-6062-05
Inputs: USB (standard plug)
Outputs: 1 x 3.5mm stereo headphone/line output
Digital Formats: PCM @ 16/24 bit 44.1, 48, 88.2, 96
Dimensions: 18 x 11 x 60mm
Weight: 21 grams
Warranty: 12 months
Contact: Amber Technology
Telephone: 1800 251 367
Web: www.ambertech.com.au

Cambridge Audio DacMagic XS \$229

Inputs: 1 x Micro-USB (USB to micro-USB cable provided)
Outputs: 1 x 3.5mm stereo headphone/line output
Digital Formats: PCM @ 16/24 bit 44.1, 48, 88.2, 96, 176.4, 192kHz
Dimensions: 30 x 10 x 53mm
Weight: 21 grams
Warranty: Two years
Distributor: Synergy Audio Visual
Telephone: 03 9459 7474
Web: www.synergyaudio.com



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Unconventional Reflections



Don't dismiss speakers with unconventional radiation patterns, suggests Geoff Forgie.



How many brands of speaker can you think of right now that use direct and reflected sound, deliberately? That is to say, they deliberately aim output backwards as well as forwards, even outwards at various angles.

There are a lot more than you'd expect, given the common wisdom that you mount all the drivers facing forwards, on the front baffle. Surely, you'd think, they wouldn't want to spray the signal all over the place, would they? What about that so-called "sweet spot"? It'd be ruined.

Yet consider ribbon and electrostatic speakers. Famous names like Quad, Magneplanar, MartinLogan and Apogee have all used forward and backward radiation in their products, all loved or at least respected by audiophile listeners.

Bose is probably best known generally for using direct and reflected sound; they've been doing it since the 901 in 1968. Further up the totem pole, B&O's top model, the \$28k Beolab 5, is omnipolar, radiating in all directions.

Mirage of Canada did a lot of bipolar speakers, and Acarian Systems with its Alon models certainly did some well-liked ones. In the retro ranks, Sonab was a very popular brand in the 1970s and its speakers are still sought after today.

One recent entry to the high-end speaker ranks is Kyron Audio, which has shown its beautifully built speakers at the last two Australian Audio & AV Show in Melbourne, receiving high praise from visitors including Stereophile's Michael Fremer, and the Kronos model recently winning Sound+Image's 2015 Award for Loudspeaker of the Year over \$20k. These are forward and backward radiating speakers (pictured left), using an open baffle arrangement.

Straight shooting

A conventional forward-firing speaker sends the signal primarily in a straight line towards you, the listener, and there's a sweet spot where the stereo image is best perceived and all that "sound staging" falls into place — not just left-to-right separation, but front-to-back as well. A good speaker can throw a 'holographic' image if everything is in the right place (including your ears).

Serious audiophiles often take great pains with speaker placement — the distance to the back and side walls, the angle of toe-in, down to the last centimetre and degree. And the results can be quite astonishing. But most of us aren't doing that. In fact, it's appropriate to ask why the narrow sweet spot is tolerated at all, when there are alternatives available that are more friendly to the less fastidious home user.

Do audiophile systems have to be that exclusive, that narrowly focused? I don't think so, and the list of top manufacturers who espouse wider radiation patterns goes some way to confirming it. Remember, also, that the room is part of the system. We don't listen in anechoic chambers.

The use of tweeters and/or midrange panel drivers radiating both forward and aft introduces a more delayed set of signals from the room boundaries, usually walls. Apart from the well-recognised speed and accuracy of ribbons and electrostatics, this dipole effect adds to the spaciousness that the listener perceives, potentially increasing the impression of a larger space in which the musicians are located. Nevertheless, most panel speakers are still going to be noticeably better on-axis than off; indeed the original Quad ESLs were notorious for 'beaming', so you needed to keep your head in just the right spot.

Sonab and Alon at home

Going a step further and having two tweeters aimed at 45 degrees to the forward axis will introduce more bounced signals. Sonab didn't stop there and had up to four (more on their top model) separately aimed tweeters in their OA14 and OA5 models. I have both these models, the OA5s in Mk2 form, and I enjoy their very spacious sound — they produce a lively sound even driven by pretty low powered amplifiers, with just enough bass, and not much wrong with the stereo imaging either, even though they are highly flexible in location. The OA14s are similar in appearance but need a bit more power and are more laidback sound-wise. The OA12 is a similar size but uses just two angled tweeters.

Sonab went all-out with the OA2212 flagship model, which had two internal bass drivers, two upward angled midrange and 12 tweeters in a curved array on the top baffle. This one has claims to serious hi-fi status, although purists will look askance at that curved array! It's a cult item now, so good luck finding a pair at a bargain price.

Various friends and acquaintances with Magneplanar, Apogee and Quad speakers going all the way back to the 1980s continue to love them. I've opted for another variation on the theme for my main stereo speakers, the Alon V. Most of the Alons look similar, and the structure is fairly straightforward except for one thing. The box is a sealed bass box with a ten-inch woofer, while sitting on top of that is a baffle which houses the midrange and tweeter. Both of these are open to the rear, so can radiate fore and aft like a planar speaker. This design won me over with its fine detail, spacious sound, and very good well-controlled bass (given a muscle amp, anyway). It's like a panel, but with more dynamics.

Hybrid designs which use ribbons or electrostatic panels for treble and midrange and then have a separate bass box are aiming for this same complete package. Some have been fairly successful, while others have exhibited quirky behaviour due to the difficulty of blending the panels with the dynamic cone bass.

Mirage back in the 1990s were riding high on a range of fully bipolar speakers which had the full duplication of treble, midrange and bass drivers front and rear. This is where we arrive at a difficulty with the concept. It works best with midrange and treble, but not as well with bass — in fact, it can give you quantities of slow or muddy bass compared to



The Sonab quotient — twin tweeters on the OA12 (left), four for the OA14 (top left) and 12 tweeters in a curved array on the remarkable OA2212 (top right).

a single-driver design; it can take a big power amplifier to control them. (Mentioning this once led to a disagreement with the manufacturer!)

A pair of M-790 models still resides in my surround system. This has just one midrange pointing backwards, and does a very good job in the theatre role, as well as for music. There were other models in that range that could also be used with average powered amps, although the larger M-990 was best used with a fairly strong integrated of 100W+, or a pre-power set-up.

I almost forgot to mention my old Vandersteen 2c. They use a degree of time-alignment, with stepped-back baffles for midrange and tweeter. They also have a backwards-firing mid/bass. I can't say in this instance that it has been a standout feature, audibly, in the pair I own. But there it is — they deliberately put that extra driver there for a purpose! The 2c and other similar models with that open-frame construction allow for wide dispersion, and even have an opening in the top-plate for upward propagation.

On a slightly different tack, there's Brad Serhan's Emergence 2.1 sat/sub system. The tweeter fires upwards and

the sound is dispersed by an angled and grooved reflector. The objective, once again, is a 'holographic' or 3D presentation, and it works well. This concept was explored previously in a model called the Solphonique, designed by Joe Hayes of Brisbane.

It was the realisation recently that my house is full of speakers which use this approach to a greater or lesser degree (Mirage, Sonab, Alon and Vandersteen) which told me both that I like the results, and that perhaps there must be something in it! I'd be pleased to hear from anyone about their experiences with similar models.

Geoff Forgie



The tweeter from the Emergence AS8 'Acoustic3D' system.



Unblocking the 4K Pipe



Having predicted that UHD broadcasting was dead and buried a mere couple of issues back, Derek Powell admits to seeing some astonishing signs of light at the end of the 4K tunnel.

Only two issues ago, I attempted to pick the winners and losers amongst the new breed of TVs. Back then, I consigned 4K resolution to the same desolate wasteland as 3D, pronouncing that while it undoubtedly worked spectacularly well, it was dead in the water without any practical means of delivering content to the screen.

In the matter of a few short months we now have not one but two competing technologies that might change all that — and what's more, I have been contradicted by no less an authority than the BBC! So what's the latest — and is it good news?

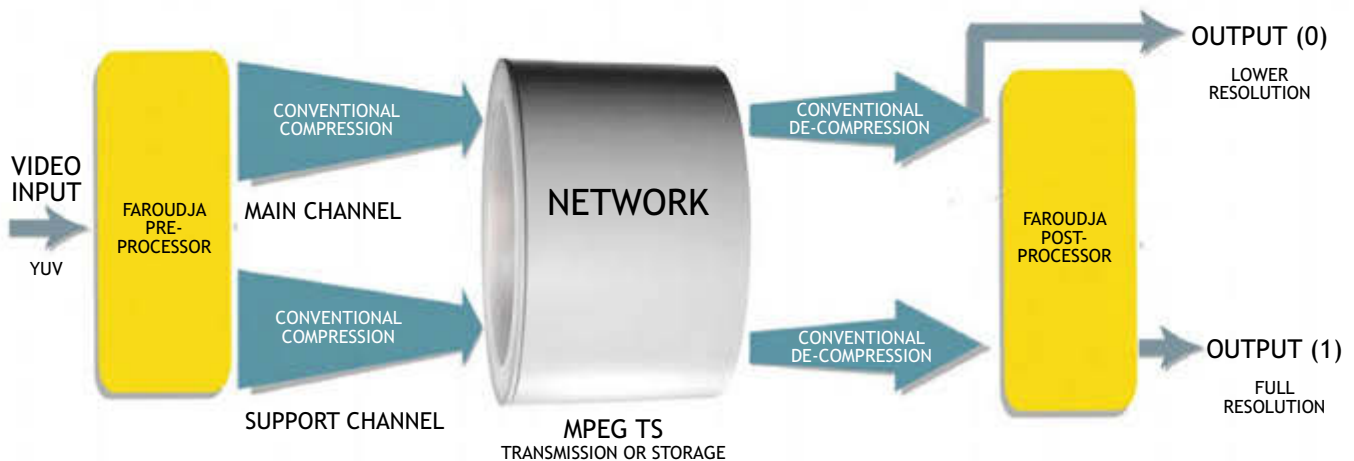
The annual National Association of Broadcasters (NAB) Show is a good predictor of where broadcast technology is heading and this year there were a few significant clues to a potential 4K future.

F1 for speed

The first salvo came from Faroudja — a technology company that has won no less than three Emmy Awards for its developments in improving video quality. They were back this year showing their patented F1 pre/post processing system (see block diagram) which claims to achieve a reduction of up to 50% in bit-rate — using any

compression standard and at any frame rate, line structure, and colour depth. This is truly remarkable as it offers a new way to improve on the best encoders (including MPEG-4 and HVEC which are yet to be implemented in broadcasting in Australia). So it is a way of reducing bandwidth that works in addition to more efficient codecs.

The F1 process works by first pre-processing the video to remove the kind of information that is known to produce artifacts. In an interview for *US Screen Plays* magazine Yves Faroudja explained: "What we do is simplify the video for compression without the artifacts that complicate



ABOVE: Faroudja's F1 processing compares a 4K original to a downsample, then uses the downsample and the difference to reconstruct the original. This achieves a bit-rate reduction of up to 50%, claims the company. Output (0) provides a second lower-res stream at no additional bandwidth cost.

things for the compression system," he explained. "We know that the best way to prevent those artifacts from occurring or, if they do occur, to make sure they won't be as visible, is by shaping the video before it's compressed and by processing it after it's decompressed."

So let's imagine we start with a UHD signal. The F1 pre-processing system first creates a cleaned-up, lower resolution (for example 1080p) version of the original signal called the Main Channel which is then compressed by whatever codec the broadcaster wants to use (MPEG-4 HVEC and so on). Because it is a 'clean' signal, derived using Faroudja's patented algorithms, it takes far fewer bits to encode and doesn't generate as many luminance, motion or banding artifacts. Once the Main Channel is decoded at the receiver this produces a very useable 1080p output which can be viewed on tablets and mobile devices. But of course that's not the final product.

Back at the pre-processor, the low resolution Main Channel is fed into a system to scale it back up to UHD. This produces a signal with few compression artifacts which is close but obviously not identical to the original UHD image. Now, the pre-processor compares the down-then-upscaled image with the original and works out where the differences are. Because most pixels are substantially the same, the "difference signal" that is derived contains a lot less data, so it is encoded onto a so-called Support Channel and sent along with the Main Channel to the receiver.

At the receiver the post-processor again up-scales the Main Channel to produce a high resolution signal that once again is close to, but not exactly the same as, the original UHD signal. It then uses the difference signal from the Support Channel to correct the Main Channel pixel-by-pixel to faithfully reproduce the original.

I should stress that Faroudja's F1 pre-post processing hasn't been taken up yet, but many of his earlier inventions are still in widespread use (such as his patented method for detecting the 3:2 film pull-down sequence). So there's every reason to take notice of the technology.

Riding the Beamr

Faroudja is not alone in this market. Israeli company Beamr is also claiming to reduce bit-rates — by around 40% — using its proprietary add-on to existing encoders such as MPEG-4 AVC. The difference is that Beamr technology is applied after encoding, where it asserts it can reduce bits where they are least likely to be noticed. Beamr claims its process imitates the "perceptual qualities of the human visual system" and will eliminate detail from areas that (they say) don't need it — such as blurred backgrounds and smooth textures. Unlike F1, though, it doesn't put those details back.

If we combine Faroudja's (and other) techniques to nearly halve the bandwidth with the much more efficient coding provided by MPEG-4 and HEVC then we are starting to approach the bit-rates Australian broadcasters are currently employing to bring us conventional HD channels.

But are broadcasters even interested?

One ray of hope comes from Matthew Postgate, the chief technology officer of the BBC, who has been widely re-quoted for his comments to London's *Financial Times*, where he is reported saying that the BBC would be broadcasting 4K in a "standardised, formalised way" by 2016. While this would be in time for the Rio Olympics, the IOC has maintained as lately as February that they have no plans for 4K coverage.

Of course broadcasters are only one (increasingly small) part of this story. Satellite and internet-based providers are talking up plans for multiple UHD offerings.

Even if widely adopted, however, these add-on bit-rate reduction techniques to halve bitrates wouldn't be enough by themselves to make full UHD broadcasting viable. We must remember that 3840×2160 images contain *four* times as many pixels as 1920×1080 — and what's more, we are now talking about increased frame rates, and adding more bits to each pixel to provide a wider colour gamut. And potentially greater dynamic range as well.

The myth of Perseus

That's why new codecs are still being actively researched — like the 'Perseus' system from new entrant V-Nova which was launched at NAB. Very little technical information has so far been released on Perseus (a fact that is causing some skepticism in the industry) and the claims made certainly have a familiar ring. According to its own website, Perseus offers three times the compression "versus state of the art in practical use cases" and is "based on the principles underlying human vision" which all sounds eerily familiar. Still, it also claims to be part of a global consortium that "features two of the top ten global telecoms, three of the top ten largest media & broadcasting groups and six of the top twenty global technology groups". So they are plainly worth more than a passing glance.

So where does that leave us? We now have the world's leading free-to-air broadcaster actively talking up the prospect of UHD channels by as early as next year (though not, sadly, any broadcasters in Australia), and internet-based Video on Demand or over-the-top services signaling full steam ahead towards a high resolution future. If we add Faroudja's innovative new processing and at least the prospect of still more efficient codecs, then UHD does seem to be coming into sharper focus. +

Derek Powell



THE HUNGER GAMES: MOCKINGJAY PART 1

2014 — Roadshow Entertainment

Director: Francis Lawrence

Starring: Jennifer Lawrence, Josh Hutcherson, Liam Hemsworth, Woody Harrelson, Donald Sutherland, Philip Seymour Hoffman, Julianne Moore, Willow Shields, Finnick Odair, Elizabeth Banks



As now seems to be standard practice when you get to the last novel in a hit series, its film version has to be split in two, or perhaps even three. With the final instalment of 'The Hunger Games' they've gone with two.

We all recall that The Hunger Games is about a stratified society in which most people are kept in working ghettos while those in the Capital enjoy sybaritic, superficial existences. Every so often, a bunch of teens from the ghettos are scooped up and forced to participate in a fight-to-the-death extravaganza. Katniss Everdeen won her 'game' and broke the rules, forcing the powers to allow her kind-of friend Peeta Mellark to live. In the second movie previous winners are thrown back into the fray, and Peeta ends up imprisoned by the rulers while Katniss is taken to join a rebel underground.

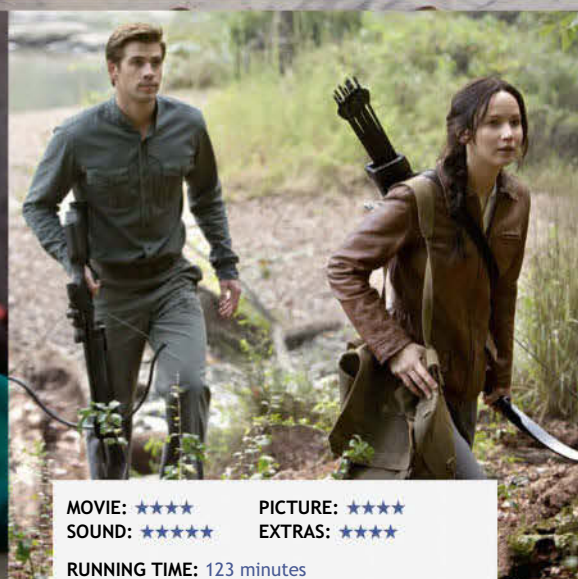
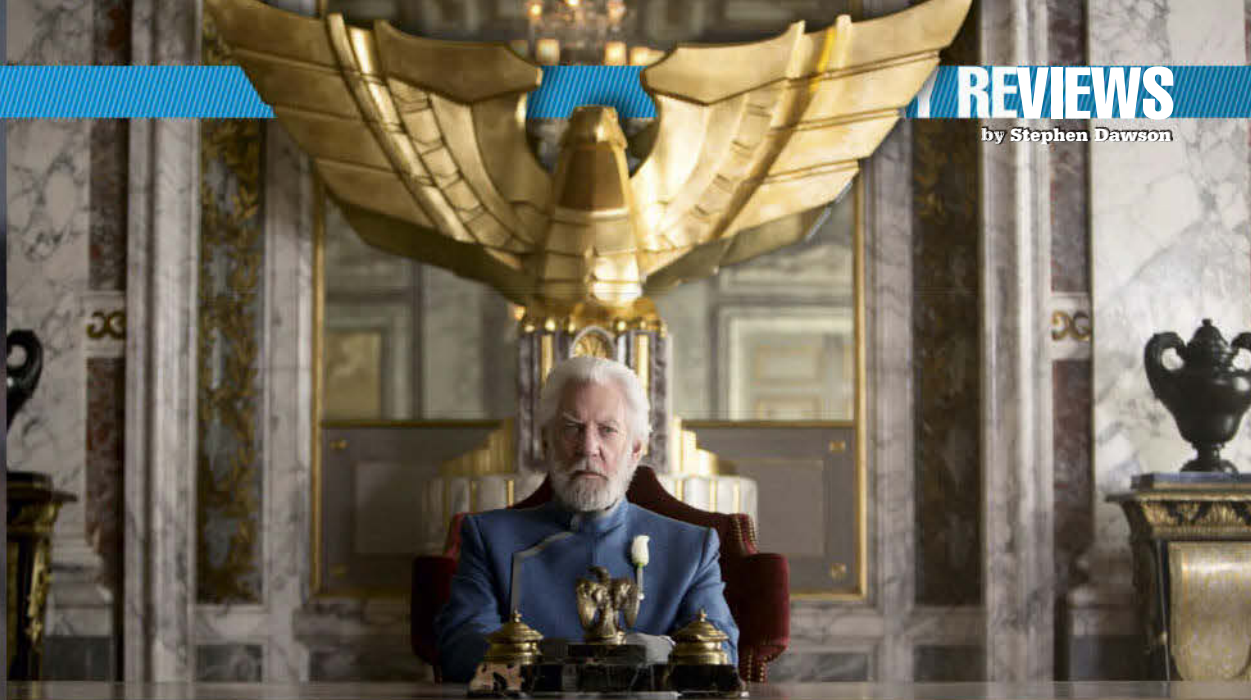
And now the rebellion is fighting back, as Plutarch Heavensbee (Philip Seymour Hoffman in one of his last roles) tries to turn Katniss into a propaganda tool.

There are no actual games in this instalment, and this seems to have disappointed many viewers, so it scores a mediocre 6.8 on IMDB (compared to 7.3 and 7.7 for the previous two). I enjoyed it though. There are a few strong action scenes, and some interesting cat and mouse between President Snow (Donald Sutherland) and the rebel leadership. Jennifer Lawrence continues to inhabit the role of Katniss impressively.

But what's special about this disc is the Dolby Atmos encoding. Oh. My. Goodness! Take the scene where Katniss is in some kind of underground facility, recovering from trauma. She has been escorted to see someone and is on an elevator. And this is what Atmos is all about.

I wrote last issue that it was hard to see what advantages Atmos lent to 'Teenage Mutant Ninja Turtles' because everything was so frenetic. While no slouch, this movie is leisurely by comparison in its pacing, and you have time be enveloped in a subtle yet profound soundfield. It isn't flashy. It isn't showing off. But it is engulfing. I was surrounded by reverberance from the tunnel-like accommodations. I heard the little mechanical noises of a poorly maintained elevator, above, behind, to the sides, at nearly all places on a dome around me. So like real life that it made all I've experienced before sound like fakes.

Now it could be that some of this — the seeming greater horizontal spread than surround tracks generally achieve, for example — might not be directly due to Atmos as such. There's no reason why material in the horizontal plane can't cover a full 360 degrees with older surround sound systems. But I suspect that the Atmos production tools have encouraged the audio engineers creating movie soundtracks to provide surround tracks less tied to specific speakers, resulting in sound that could have been produced by a hundred speakers surrounding the listener rather than five or seven (and for the record, I was



MOVIE: ★★★★★
SOUND: ★★★★★

PICTURE: ★★★★★
EXTRAS: ★★★★★

RUNNING TIME: 123 minutes

PICTURE: 2.35:1, 1080p/24, MPEG4 AVC @ 16.48Mbps

SOUND: English: Dolby TrueHD Atmos 24/48 3/4.1 @ 4803Mbps (embedded: Dolby Digital 3/2.1 @ 640kbps); DTS-HD Master Audio 24/48 3/2.1 @ 3621kbps (core: DTS 24/48 3/2.1 @ 1509kbps); English Audio Descriptive, English (Optimised for Late Night Listening), Commentary: Dolby Digital 2/0.0 @ 192kbps; English: DTS Headphone X encoded in DTS-HD Master Audio 24/48 2/0.0 @ 1594kbps (core: DTS 24/48 2/0.0 @ 768kbps)

SUBTITLES: English

FEATURES: Ultraviolet; Documentary (1080p/24 - 134 mins); 9 Deleted Scenes (1080p/24 - 11 mins); 2 Featurettes (1080p/24 - 19 mins); Music Video (1080p/24 - 4 mins)

RESTRICTIONS: Rated M, Locked to Region B

using a 5.1.4 system, with good quality ceiling speakers for the height channels).

Of course, the height couldn't be done in any convincing way with what went before, so that is all due to Atmos.

This exciting new sound held up across the movie, right to the end. Other audio highlights for Atmos were the crowd scenes in the underground bunker, the times people were deposited on the ground by very noisy aircraft, the bombing of the bunkers and, most of all, the moment of

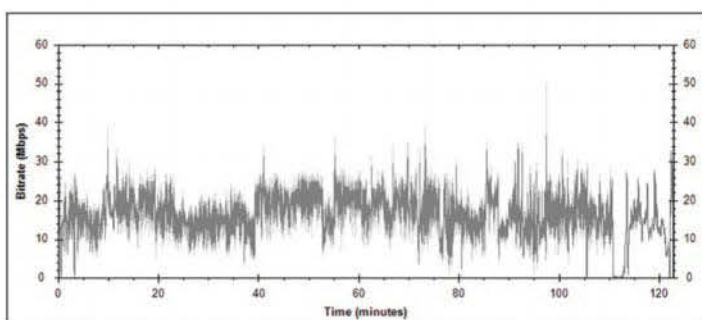
rest beside the lake where the mockingjays were singing, precisely positioned all over, their echoes bouncing through the ravine in which the lake lay. Gorgeous and involving stuff all.

To be picky: there was a brief moment where we are looking somewhat down on an aircraft from behind, yet some of its internal sounds appear from overhead. That aside, this is a movie with the best surround soundtrack I've ever experienced.

That's not the end of it. If you prefer you can run the movie in standard DTS-HD Master Audio 5.1. Or in a stereo version that's 'Optimised for Late Night Listening' (i.e. compressed). Or in DTS

Headphone X, where it has been remixed into two channels in a way that makes it seem surround-like when heard through headphones.

This feature-laden presentation is on two Blu-ray discs. There's a code for an Ultraviolet portable version.



Video bit-rate for 'The Hunger Games: Mockingjay part 1' main feature

Most of the extras, numerically, are on the movie disc — deleted scenes, a music video and 19 minutes of featurettes. Disappointingly Roadshow has only used 67% of the space available on the double-layer Disc 1 for both those extras and the movie, resulting in the movie scoring a mediocre 16.48Mbps. It didn't seem to suffer visually as a result, but it isn't especially long and the bit-rate could easily have been pushed into at least the mid-20s. The second disc contains a two-and-a-quarter hour making-of documentary. +



INTERSTELLAR

2014 — Warner Bros Entertainment Australia



Director: Christopher Nolan

Starring: Ellen Burstyn, Matthew McConaughey, Mackenzie Foy, John Lithgow, Timothée Chalamet, Bill Irwin, Anne Hathaway, Andrew Borba, Wes Bentley, William Devane, Michael Caine, Jessica Chastain, Matt Damon

Interstellar is Christopher Nolan's 10th movie. Of those, seven are presently residing in the IMDB Top 250 list, including this one (8.7/10, #26 on the list). I'd say that two reasons for this performance are originality, and the ability to convey complex concepts clearly. How many layers down into the dream world did they go

in 'Inception'? 'Memento' ran entirely in reverse chronological order. There were two completely different ways of magically 'transporting' a person in 'The Prestige'.

And, now, time dilation.

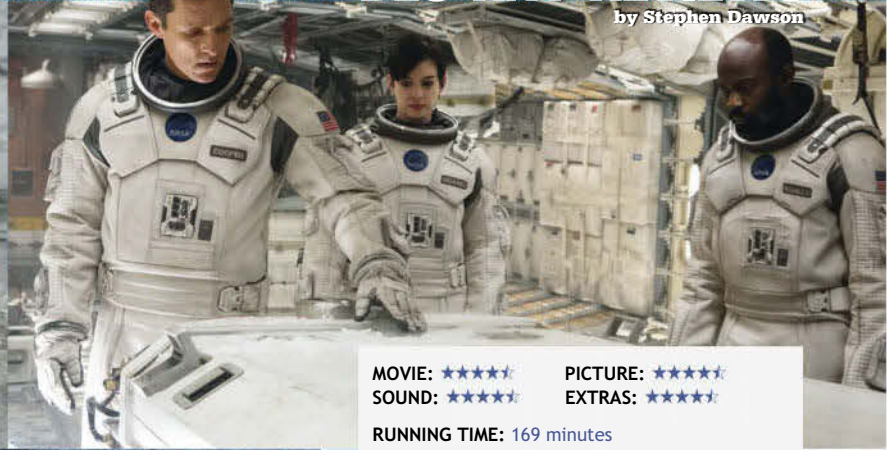
Matthew McConaughey is an engineer and pilot turned Midwestern farmer at some point



in the future. Life looks easy, but it turns out that crops are dying one by one, increasingly common dust storms bring all activity to a halt, humanity itself is feared to soon become extinct. But society has rejected science and technology. The moon landing is now regarded as a clever hoax by the US government to provoke the Soviet

BLU-RAY REVIEWS

by Stephen Dawson



MOVIE: ★★★★★
SOUND: ★★★★★

PICTURE: ★★★★★
EXTRAS: ★★★★★

RUNNING TIME: 169 minutes

PICTURE: 2.35:1, 1080p/24, MPEG4 AVC @ 24.22Mbps

SOUND: English: DTS-HD Master Audio 24/48 3/2.1 @ 3693kbps (core: DTS 24/48 3/2.1 @ 1509kbps); German: DTS-HD Master Audio 24/48 3/2.1 @ 3704kbps (core: DTS 24/48 3/2.1 @ 1509kbps); English Audio Descriptive, Spanish, Japanese (hidden): Dolby Digital 3/2.1 @ 640kbps

SUBTITLES: English, German, Spanish, Danish, Finnish, Icelandic, Norwegian, Swedish, Japanese (Hidden), Japanese (Hidden, titles), Spanish (Titles)

FEATURES: Documentary: 'The Science of Interstellar' (1080p/24 - 50 mins); 14 Featurettes (1080p/24 - 122 mins)

RESTRICTIONS: Rated M, Region Free

especially the cornfield scenes near the start. Just occasionally, and unavoidably in view of the eight-bit colour depth of Blu-ray, there's a little posterisation in those broad space vistas with their subtle low-light brightness changes.

The soundfield is impressive as well, whether in a dust storm on Earth, or in a spaceship untold light years away. Indeed, the delivery on both video and audio front is as epic as the story itself. As usual with Warner titles, there is Japanese language support (both subtitles and audio in this case) but it is completely invisible unless your player is set to Japanese as the default language, in which case all the menus are also in Japanese. +

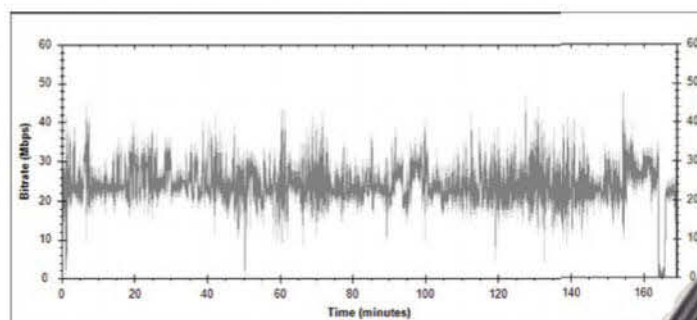
Union into overspending, thereby bringing it down. There's a delicious scene where a school teacher declares this falsehood with complete certainty to an unbeliever.

But it turns out that NASA has been on the case and has found some candidate planets that might support human life. They need McConaughey to pilot their spacecraft to a wormhole near Saturn, through which previous expeditions have jumped many light years to assess the suitability of these candidates. And Anne Hathaway, scientist Michael Caine's daughter, will be going too.

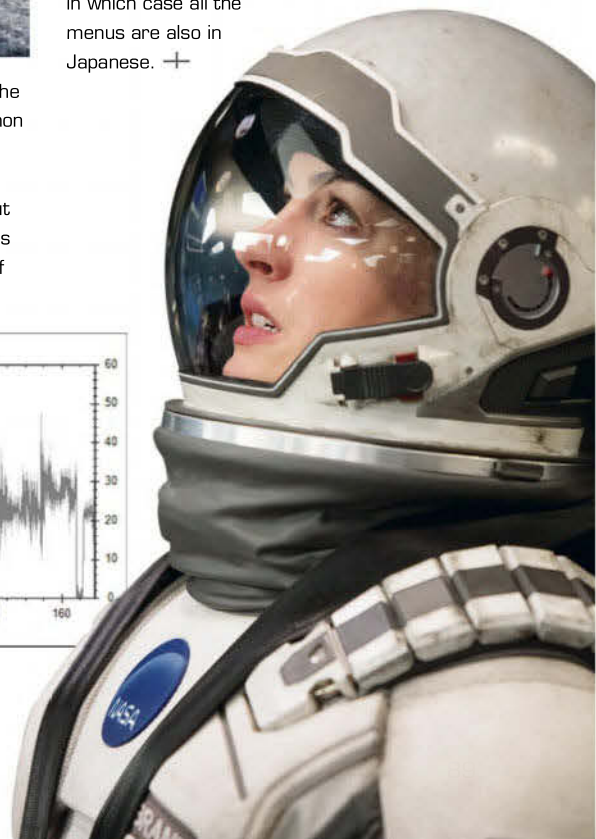
The major time dilation they experience is when on a planet near a black hole — a half hour on its surface takes, from the point of view of the person remaining on the spaceship, many years.

There's a fine human story here along with the sciencey one, including a nice turn by Matt Damon in semi-pudgy mode, as a bit of an antihero.

This is a long movie — eleven minutes short of three hours — so Warner Bros has wisely put all the extras on a second disc. The movie disc is nearly 43 gigabytes, delivering a video bit-rate of over 24Mbps. The picture is wonderfully sharp,



Video bit-rate for 'Interstellar' main feature





2014 — Madman Entertainment Pty Ltd



Director: Jemaine Clement/Taika Waititi

Starring: Jemaine Clement, Taika Waititi, Jonathan Brough,

Cori Gonzalez-Macuer, Stuart Rutherford, Ben Fransham, Rhys Darby, Jackie van Beek

Here is all you need to know about 'What We Do in the Shadows' — a share house in Wellington, New Zealand, with four occupants, all of whom are vampires reflecting various sub-genre types. Petyr (8000 years old, of whom we see little because he rarely emerges from his stone casket) is straight out of 'Nosferatu'.

The movie opens with a well-worn, slightly jiggling, washed-out logo from 'The New Zealand Documentary Board', because it purports to be a documentary about members of a 'secret society' who are preparing for a special event, 'The Unholy Masquerade'. A panel notes that "Each crew

member wore a crucifix and was granted protection by the subjects of the film".

The 379-year-old Viago does most of the talking, while the crew follows the housemates, 'The Office' style, through their, er, nightly routines. After arising from their coffins, they conduct a flat-mates meeting to deal with the important subject of their youngest member, Deacon (183 years), failing to do the dishes.

We see how they deal with their nightly difficulties — trying to present themselves nicely when they can't see themselves in the mirror; being unable to enter any premises without being invited in; occasionally nicking an artery rather than a

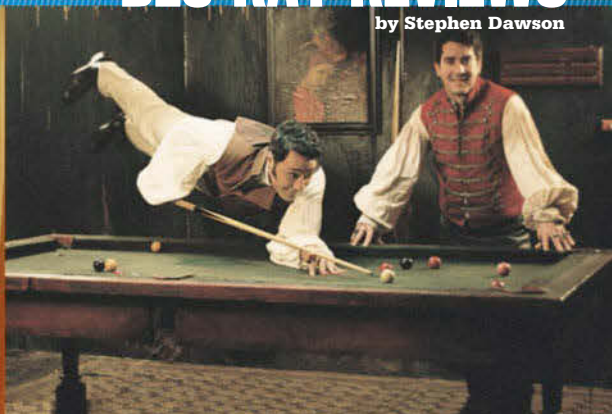


vein, resulting in a meal being sprayed across a room rather than being properly consumed. Did you know there are about 60 vampires in the Greater Wellington area? We meet their human friends, familiars, with a nice turn by Jackie van Beek who wants, after four-and-half years of labour for Viago, the gift of eternal life.

There were no extras, except a trailer, on the review version, although there is now a three-disc 'Fang-Bloody-Tastic' version available. There are no subtitles, so your ears need to be up to the occasional challenge of New Zealanders speaking in vaguely middle-European accents. The cinematography and sound is in keeping with pseudo-documentary style, and the shortish run time is just right for this funny, charming, and mostly understated film. +

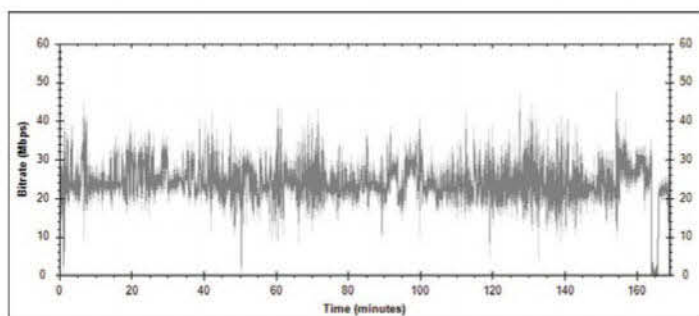
BLU-RAY REVIEWS

by Stephen Dawson

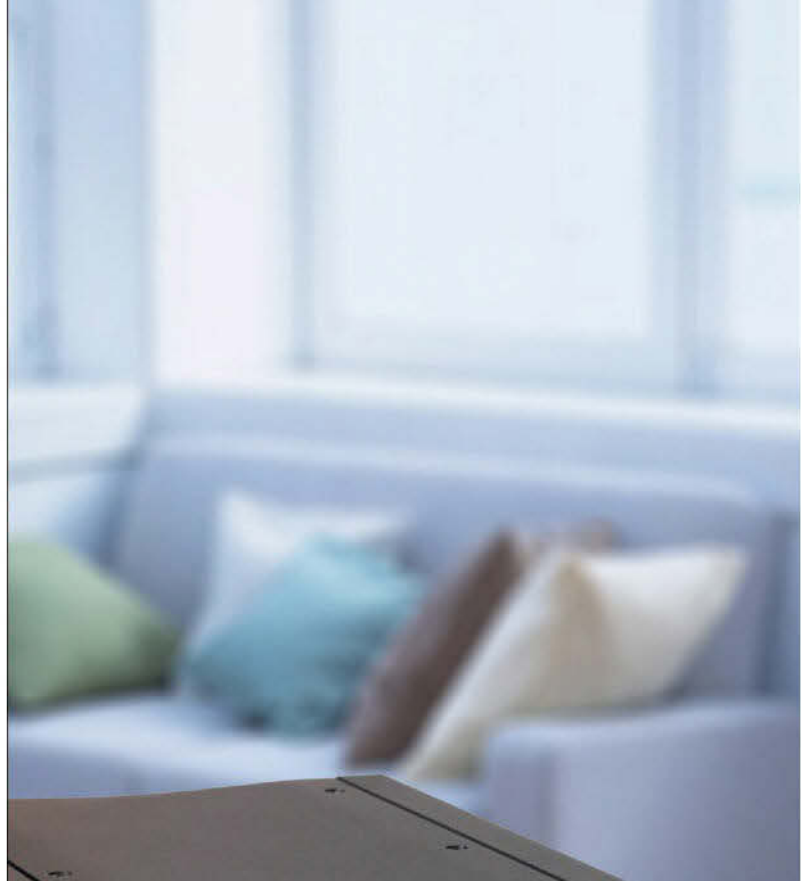


MOVIE: ★★★★★
SOUND: ★★★★★
RUNNING TIME: 85 minutes
PICTURE: 1.85:1, 1080p/24*, MPEG4 AVC @ 29.00Mbps
SOUND: English: DTS-HD Master Audio 16/48 3/2.1 @ 1767kbps (core: DTS 16/48 3/2.1 @ 1509kbps)
SUBTITLES: Nil
FEATURES: Trailer (1080p/24 - 2 mins)
RESTRICTIONS: Rated M, Locked to Region B
PIC CREDIT: © Shadow Pictures Ltd MMXIV

PICTURE: ★★★★★
EXTRAS: 0.0



Video bit-rate for 'What We Do In The Shadows' main feature



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LOUDSPEAKERS

WELCOME

Our buying guide is based on the Sound+Image Awards we present each year – the very best value at each price level. We list all still-available products, varying categories each issue. This time we have all our speaker categories (stereo, wireless & surround packs), plus AV receivers, projectors and digital sources.

Loudspeakers

B&W's 685 S2



Every model listed here has won a Sound+Image award – they represent the height of loudspeaker design and each offers top-value performance at its price, whether low or high! Different finishes can change the pricing, so check with your dealer or the manufacturers' website for more details.

Make and model	Price	Award	AVHub	Website	
Usher Audio S-520	\$490	HC 2013	✓	www.westan.com.au	A longstanding high-quality design alone or with a subwoofer. Price varies with finish.
Xavian Bonbonus	\$499	HC 2014	✓	www.finallink.com.au	The first 'low-cost' Xavian is a great success – a solid small package with plenty of colour options!
Focal Chorus 706	\$899	HC 2015	✓	www.nadist.com.au	Classic cabinet design (gorgeous walnut veneer) yields superb imaging and highs, glorious mids.
Q Acoustics Concept 20	\$929	HC 2015		www.westan.com.au	Amazing results from usefully compact standmounters; their optional matching stands are \$729.
B&W 685 S2	\$999	W 2015	✓	www.convoy.com.au	Hugely engaging and musical, they performed above many speakers at double the price.
Krix Acoustix Mk2	\$1,195	W 2015		www.krix.com.au	Three-driver two-way standmounts that sound like floorstanders with outstanding soundstaging.
GoldenEar Technology Aon 3	\$1,645	HC 2014	✓	www.kedcorp.com.au	Strangely-shaped standmounters combining active and passive drivers to great effect.
Krix Phoenix mk2	\$1,795	W 2014	✓	www.krix.com.au	Usefully small floorstanders with a really big sound, amazingly lucid and highly accurate.
Krix Epix	\$1,995	W 2015		www.krix.com.au	In-wall speakers (price is per speaker) we are happy to recommend, based on Krix's Neuphonix.
Orpheus Apollo VI	\$2,000	HC 2012	✓	www.orpheusaudio.com.au	Beautifully crafted, delivering fast and tight bass, smooth midrange and extended treble.
KEF LS 50	\$2,299	W 2013	✓	www.advanceaudio.com.au	Inspired by the classic LS3/5A, exemplary build and sonics combine in this superb speaker.
Whatmough P28-SE	\$2,699	W 2012		www.whatmoughaudio.com.au	The DNA of the P33i but at high value, floorstanders a class above their price (varies with finish).
Equinox Eclipse	\$2,900	HC 2013	✓	www.equinoxaudio.com.au	The handcrafted Eclipse sounds ultrasmooth and uncoloured, with extended highs, natural lows.
Sonus faber Venere 2.5	\$3,799	HC 2014		www.synergyaudio.com	Italian design with Chinese build - great value and exciting presentation from these stunners.
Aaron HMF-600MkII	\$4,499	HC 2011	✓	www.aaronhifi.com.au	Hume L'Estrange's Hyperboloid marvels MkII, deep extended bass, superb mids and highs.
Atlantic Technology AT-1	\$5,500	HC 2012	✓	www.networkav.com.au	H-PAS technology for powerful bass, extended highs plus an articulate midrange – great speakers.
Jamo C 109	\$5,690	HC 2015		www.qualifi.com.au	The flagship of the Concert Series from now Klipsch-owned Jamo, exciting and highly dynamic.
Yamaha Soavo NS-F901	\$5,999	W 2015		au.yamaha.com	Glossed like their pianos and equally musical, the Soavos sound realistic, detailed and musical.
JBL 4429 Studio Monitor	\$7,999	HC 2013	✓	www.convoy.com.au	Stunning studio-style sound with power and dynamics – one of our longterm reference designs.
Sonance Landscape Series	\$8,000	W 2012		www.ambertech.com.au	Outdoor garden speakers with clever sub-sat system for even coverage. Price varies with set-up.
Whatmough P33i Signature	\$9,500	HC 2012		www.whatmoughaudio.com.au	Slim but tall, surprisingly heavy, and superbly balanced performance. Price varies with finish.
Sony SS-NA2ES	\$9,999	W 2014	✓	www.sony.com.au	Sony surprised many by taking our top 2014 award for these sophisticated, sweet floorstanders.
MartinLogan Ethos	\$9,999	W 2012	✓	www.audioactive.com.au	Effortless electrostatic sound supported by conventional bass drivers. Lovely; sound the gong.
Audio Physic Virgo 25 plus+	\$19,400	HC 2015		www.radianceav.com.au	An outstanding 25th anniversary design, tonally accurate and detailed. Price varies with finish.
Vivid Audio B1	\$19,900	HC 2013	✓	www.avation.com.au	One-piece with its stand, the B1 is artwork and speaker combined, expertly voiced and refined.
B&W 802 Diamond	\$21,000	W 2013	✓	www.convoy.com.au	Magnificent – the Abbey Road references are an utterly musical and thrillingly smooth listen.
Whatmough Signature Progeny	\$28,000	HC 2015		www.whatmoughaudio.com.au	Descendent of Whatmough's ultimate Paragon, revelatory resolution and huge delivery.
Dynaudio Confidence C4	\$31,999	HC 2011	✓	www.dynaudio.com/au	Immaculate build & design, superb sound commensurate with their high-end aspirations.
Vivid Audio GIYA G3	\$45,000	W 2014		www.avation.com.au	We gave a special Judges' Choice award for Laurence Dickie's sonic sculptures, a genuine classic.
Wilson Audio Sasha Series-2	\$51,795	HC 2015		www.advanceaudio.com.au	Profound frequency-wide impact with an immersive soundfield, Wilson improves a classic.
Wilson Audio Alexia	\$79,295	W 2014	✓	www.advanceaudio.com.au	Heroic construction and mystery compounds, delivering music beyond all expectations.
Kyron Audio Kronos	\$82,225	W 2015		www.kyron.com.au	Our speakers of the year, Best Sound in Show – world-class Australian system speakers.
TAD Reference One	\$88,000	HC 2014		www.pioneer.com.au	Pioneer's 'Formula 1 racing division', their Reference Series flagships did not disappoint.

let there
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& happiness

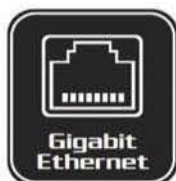



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One of the most active categories of recent years, wireless speakers can use Bluetooth, AirPlay or DLNA, or can even form part of a coordinated multiroom system (like those reviewed in-depth in this issue). All the models below have won Sound+Image Awards.

Make and model	Price	Award	AVHub	Website	
Bose SoundLink Mini	\$249	HC 2014	✓	www.bose.com.au	Bose's Bluetooth speaker hits a sweet-spot of sound and size together with solid build quality.
Pure Jongo T6	\$399	HC 2015		www.pure.com.au	The largest of the Pure Jongo multiroom speakers – pair them in stereo for a truly massive sound.
Focal XS Book Wireless	\$499	W 2015		www.nadist.com.au	Wireless units rarely create good stereo – the Focals are an exception, using two connected units.
AktiMate Micro B	\$549	W 2015	✓	www.aktimate.com.au	Triple award winner (also HC 2014, W 2012), the Bluetooth/USB Micro B is a great desktop pair.
Bose SoundTouch Portable	\$549	HC 2015		www.bose.com.au	Now with SoundTouch Series II software, Bose's portable player is one of its good 'uns.
Philips M1X-DJ	\$550	HC 2015		www.philips.com.au	Designed with Armin van Buuren, using djay 2 app for desk dancing or Bluetooth for streaming.
B&W Zeppelin Air	\$600	W 2012		www.convoy.com.au	The classic Zeppelin AirPlay/dock design still sounds great, and is now better value than ever.
HEOS 5	\$649	W 2015	✓	www.heosbydenon.com.au	The middle of three wireless multiroom speaker units in the HEOS by Denon ecosystem.
Sonos Play:5	\$649	HC 2011	✓	www.playback.com.au	A stunning speaker unit when launched, now under siege from the new multiroom systems.
NAD Viso 1	\$899	W 2013		www.nad.com.au	Slightly weird but making a lovely big sound, combining Bluetooth with a physical iPhone dock.
Loewe AirSpeaker	\$999	W 2013		www.loewe.tv/au	Stylish and colour coordinated, the AirPlay-equipped Loewe proved a sophisticated performer.
AktiMate Blue	\$1,095	HC 2014	✓	www.aktimate.com.au	Large active speakers with Bluetooth, USB and other inputs – almost a full system solution.
B&W A7	\$1,300	W 2014		www.convoy.com.au	B&W's wireless units are sophisticated in every way and make beautiful room-filling music.
JBL Authentics L16	\$1,699	W 2015		www.convoy.com.au	The size and 70s' styling may not be for everyone, but one of the best standalone speakers ever.
Geneva Sound System Model XS	\$299*	HC 2013		www.audiodynamics.com.au	*The dinkiest of Geneva's sound systems, part clock-radio, part portable wireless speaker.
Accent Digital Muse	\$349*	HC 2014		www.ambertech.com.au	*Not the prettiest unit in the world but exceptional value given the size and sound at the price.
Samsung DA-E750	\$349*	HC 2013		www.samsung.com.au	*Now discontinued but a versatile and beautiful unit still worth tracking down.
Pioneer XW-SMA3	\$499*	HC 2013		www.powermove.com.au	*Pioneer's first release of wireless speakers were plain but offered good sound for the price
Geneva S DAB+	\$699*	W 2011		www.audiodynamics.com.au	*A lovely gloss-finished tabletop speaker with Bluetooth streaming and DAB+/FM radio.
AktiMate Mini+	\$795*	HC 2013		www.aktimate.com.au	*Now updated with Bluetooth and retaining our recommendation for its superb performance.
Dynaudio Xeo 3	\$2,349*	HC 2013		www.dynaudio.com/au	*We loved the sound quality of these original Xeos, now coming in a new "revolutionary" form!

Soundbars and bases

Denon's DHT-S514 soundbar & sub



Soundbars sit in front of your TV, sound bases sit underneath your TV. They're not a true replacement for decent stereo or surround speakers, but the best do a good job improving the thin sound that comes from today's flatpanel TVs and make for enjoyable movie watching.

Make and model	Price	Award	AVHub	Website	
Denon DHT-T100 sound base	\$549	HC 2015	✓	www.au.denon.com	A small base but producing great sonic push for one so small, a good TV booster.
Yamaha SRT-1000 sound base	\$699	W 2015		au.yamaha.com	No HDMI but two optical, one electrical and one analogue input and great sound at the price.
ZVOX Z-Base 580 sound base	\$799	W 2014		www.qualifi.com.au	The unit that showed us bases have more space to make sound, yet have less impact on décor.
Denon DHT-S514 soundbar	\$999	W 2015		www.au.denon.com	Slim soundbar with wireless subwoofer, and one of the most musical soundbars we've heard.
Yamaha YSP-2500 soundbar	\$1,099	HC 2015	✓	au.yamaha.com	Loads of tech here, with 3 HDMI inputs and Yamaha's long-developed Digital Sound Projection.
B&W Panorama 2 soundbar	\$2,699	HC 2014	✓	www.convoy.com.au	Stunningly powerful sound, cool design and more musical performance than its predecessor.
Yamaha YSP-5100 soundbar	\$2,999	HC 2011		au.yamaha.com	Yamaha uses 40 'beams' from individual drivers to steer surround off walls for remarkable results.

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*If there are changes in the region / time zone, manual time zone selection may be required.

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AV projectors

Epson EH-TW9200W



TVs are getting bigger, but projection is still the way for a truly bigscreen experience at home. Projection at 4K is still a rarity and comes at a price, but for 1080p there are some stunning projectors at high-value prices. Don't forget to invest in a decent screen

Make and model	Price	Award	AVHub	Website	
BenQ W7500	\$3,499	HC 2015		www.benq.com.au	BenQ shows it can do more than entry-level - and exceptional 3D from this projector.
Epson EH-TW9200W	\$3,999	W 2015		www.epson.com.au	Built-in wireless to avoid HDMI runs, plus wonderfully bright and bold performance.
Sharp XV-30000	\$4,999	W 2013	✓	www.sharp.net.au	Sharp's great 2D performance and fantastic DLP crosstalk-free 3D impressed us.
Sony VPL-VW500ES	\$13,999	W 2015	✓	www.sony.com.au	Sony continues its 4K projection dominance. We love the subsequent VW300ES as well.
Runco QuantumColor Q-750i	\$25,500	HC 2011	✓	www.networkav.com.au	New lamp technology - RGB InfiniLight LEDs - for long-lasting Runco wonderfulness.
BenQ W1080ST AV projector	\$1,499*	HC 2014		www.benq.com.au	*Excellent value short-throw projector, now updated in its + version.
Sony VPL-VW1000ES AV projector	\$25,999*	W 2014	✓	www.sony.com.au	*Superseded by the VW1100 ES, this was the first true 4K projection available, at a price!

Digital sources

Marantz CD5005 CD player



Our world of audio now has a profusion of digital sources — CD players, network players, digital players, media servers, and we've included Blu-ray players here as well. All here are award-winners, the best of the best, and top value at their price.

Make and model	Price	Award	AVHub	Website	
MEDIA SERVERS Apple TV	\$109	HC 2011	✓	www.apple.com.au	It's changed lots since this award, with more to come - essential for Apple users.
Western Digital WDTV	\$139	HC 2015	✓	www.wd.com	It's the media box that plays everything (except 4K); better for video than stills.
CD PLAYERS Marantz CD5005	\$550	W 2015		www.marantz.com.au	A sweet-sounding and dynamic CD player, also with digital output, at a sweet-spot price.
Cambridge Audio 851C	\$2,499	HC 2014		www.synergiaudio.com	A CD, DAC and preamp, really - including USB-B input. Versatile, then, and extremely able.
Unison Research Unico CD Primo	\$2,999	HC 2011	✓	www.radianceav.com.au	Italian design, valve Class-A output stage, and a USB-B input for DAC use: transfixing.
PS Audio PerfectWave	\$5,089/\$7,495	W 2013	✓	http://magentaudio.com.au	Two-box CD brilliance from the PS Audio Transport & DAC - a USB-B input as a bonus too.
B.M.C. BMCD1.1 / DAC1	\$6,295/\$6,589	HC 2013	✓	www.nationalaudiogroup.com.au	The belt-driven CD player can stand alone, but the DAC takes its output still higher.
Moon 750D	\$14,495	W 2011/3	✓	www.e-e.com.au	Stunning disc spinner which won our 2011 award and returned for an HC in 2013.
Ypsilon Electronics CDT-100	\$29,990	W 2015		www.telosaudio.com.au	Flawless build, and no oversampling employed to deliver its refined and delicate music.
Marantz SA-KI Pearl Lite	\$2,290*	W 2012	✓	www.marantz.com.au	*Superseded, but our 2012 CD winner was a classic CD/SACD spinner and USB DAC.
Krell S-350a CD player	\$3,595*	HC 2012	✓	www.audiomarketing.com.au	*Superseded, but a definite goodie, especially when used with its matching amplifier.
NETWORK PLAYERS HEOS Amp	\$849	W 2015	✓	www.heosbydenon.com/au	Just add speakers to make a HEOS wireless multiroom zone under smart-device control.
Yamaha NP-S2000	\$1,999	W 2012	✓	au.yamaha.com	The network player from Yamaha's hi-fi line - no USB, just DLNA streaming all the way.
Accustic Arts Streamer ES	\$7,500	W2015		http://absolutehiend.com	Stunning high-end streaming wired or wireless - you can add a separate DAC for more!
DIGITAL PLAYERS Bryston BDP-1	\$2,899	HC 2012		www.busisoft.com.au	Just a player - you need to add the DAC... aims to deliver your USB files in perfect order.
Sony HAP-Z1ES	\$2,999	HC 2015		www.sony.com.au	The Sony dupes your files onto its own hard drive for effortless playback of high-res audio.
Astell & Kern AK120	\$2,399*	HC 2014		www.busisoft.com.au	*Superseded by the MkII, A&K's upmarket portables also make excellent home DACs.
BLU-RAY PLAYERS Panasonic DMP-BDT460	\$279	W 2015	✓	www.panasonic.com.au	Great player at the price - perfect to tide you over till 4K machines arrive!
Oppe BDP-105AU	\$1,899	W 2014		www.oppe.com.au	Now with added Darbee sharpening, but the same rock-solid Blu-ray, DVD and CD player.
Pioneer BDP-160	\$199*	HC 2014		www.powermove.com.au	*Superseded, but a potential bargain if you can find one - it plays BD, DVD, CD and SACD!

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AV RECEIVERS / SPEAKER PACKAGES

WELCOME Our buying guide is based on the Sound+Image Awards we present each year – the very best value at each price level. We list all still-available products, varying categories each issue. This time we have all our speaker categories (stereo, wireless & surround packs), plus AV receivers, projectors and digital sources.

AV receivers

Yamaha's Avenge RX-A3040



The heart of any surround system, the AV receiver has been revolutionised by 'app' control and the inclusion of network streaming and online music services, but their core ability remains the delivery of clean and controlled amplifier power.

Make and model	Price	Award	AVHub	Website	
Harman Kardon AVR 151 AV receiver	\$599	HC 2014		www.convoy.com.au	One of the lowest-priced receivers we've reviewed offering high performance and value features.
Denon AVR-X1100W	\$899	W 2015		www.au.denon.com	Built-in Wi-Fi, Bluetooth, AirPlay and the usual Denon quality at an affordable price.
Yamaha RX-V577 AV receiver	\$999	HC 2015	✓	au.yamaha.com	Highly impressive stereo performance while surround movie tracks sounded clean and balanced.
Marantz NR1605	\$1,150	W 2015		www.marantz.com.au	Efficient Class-D amplification is used to allow a 'slimline' form while being full-featured.
Harman Kardon AVR 171 AV receiver	\$1,199	HC 2014		www.convoy.com.au	Steps up from the AVR 151 by adding two extra amps, higher power, Bluetooth, AirPlay and more.
Onkyo TX-NR636	\$1,299	HC 2015		www.ambertech.com.au	Includes Dolby Atmos and a comprehensive set of features on par with its competitors.
Yamaha Avenge RX-A1040	\$1,999	HC 2015		au.yamaha.com	A great mix of features while Multipoint calibration results in excellent sonic performance.
Denon AVR-X4100W	\$2,499	HC 2015		www.au.denon.com	Utterly competent and sounding "first class", now Dolby Atmos capable and a fine performer.
Yamaha Avenge RX-A3040	\$2,899	W 2015		au.yamaha.com	The state of the art, Yamaha's top integrated receiver took out our top award – yet again!
Rotel RSX-1562 AV receiver	\$2,999	HC 2013	✓	www.rotel.com.au	It may have less new media support but Rotel has focused on high quality sound.
Onkyo P-3000R/M-5000R	\$2,999/\$5,799	W 2012		www.ambertech.com.au	Onkyo flagship electronics with an inherent ability to sound refined.
Yamaha CX-A5000 / MX-A5000	\$3,699/\$3,699	HC 2014		au.yamaha.com	Statement receiver separates with Yamaha's best technologies.

Speaker packages

PSB Imagine speaker package

If you're after true surround sound, you need more than a soundbar! These packages provide matched 5.1-channel speakers (easily expandable to 7.1 or beyond), and since everyone is an award-winner, they each deliver top levels of performance and value for their price.



Make and model	Price	Award	AVHub	Website	
Boston Acoustics SoundWare XS 5.1	\$849	HC 2011		www.qualifi.com.au	Still great value, this neat 'almost-cubes plus sub' system is flexible and sounds impressive.
Pioneer FS52 speaker package	\$1,249	HC 2014		www.powermove.com.au	Amazing value for this Andrew Jones' designed 5.1 package. Contact Powermove for pricing.
Aaron MiniMax	\$1,349	HC 2012	✓	www.aaronhifi.com.au	Tremendous low frequency power combined with a versatile satellite speaker system.
Boston Acoustics A Series	\$1,999	W 2012		www.qualifi.com.au	A good value package that is less about OMG and more about getting the sound "just right".
Q Acoustics 2000i Series 5.1 Cinema Pack	\$2,116	HC 2014		www.westan.com.au	Four 23cm-high sats, plus centre and unusual sub, excellent performance. Price varies with finish.
Jamo 360 S35HCS8 speaker package	\$2,399	W 2014	✓	www.qualifi.com.au	Big music and movie sound from a small and stylish 'Omnipolar' package.
Dali Stile package	\$3,310	W 2011		www.dali.com.au	Presents a seamless soundscape that's immersive and involving. Excellent stereo performance.
Whatmough Synergy3 package	\$3,799	HC 2011		www.whatmoughaudio.com.au	Quality design in an attractive and room friendly lifestyle aesthetic. Powerful and deep bass.
KEF Audio T305	\$3,899	W 2012	✓	www.advanceaudio.com.au	Perfect mates for panels, the space-efficient T305 package performs like a much bigger system.
Aaron Hyperboloid 300 package	\$4,397	HC 2011		www.aaronhifi.com.au	System available with or without sub. Innovative drivers and good design result in thrilling sound.
PSB Speakers Imagine speaker package	\$7,146	W 2014	✓	www.qualifi.com.au	Beautifully-designed speakers that also sound superb from the 40-year-old Canadian company.
Pioneer FS51 speaker package	\$1,299*	HC 2012	✓	www.powermove.com.au	*Great Andrew Jones design, now superseded by the FS52 pack (see above).
Krix Rhythmix speaker package	\$2,995*	W 2013		www.krix.com.au	*Superseded, but a Rhythmix/Sonix/Atomix/Seismix Cube set-up today would be \$3046.
Krix Acoustix/Graphix/Seismix 3 package	\$3,780*	W 2011		www.krix.com.au	*Original price. Most models from this are now in Mk II form, with even better performance.

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Not everyone has the space to accommodate large loudspeakers, but most of us still demand the finest musical performance—with this in mind the Vivid Audio team has developed the Giya G4.

Standing just one metre high the Giya G4 packs all the unique features of the larger models in the Giya range into this compact speaker.

Made possible through the design of two new drivers, the C100S for the low mid-range, which retains the focussed field radial magnet of its larger predecessor, and the C125L long throw bass driver which uses the

extended gap design used in the rest of the Giya range.

Exceptional purity through the mid and high frequencies is assured by the combination of the D50 and D26 aluminium magnesium alloy and carbon fibre dome drivers. With their patented catenary domes these two units deliver a high frequency performance to well beyond the range of human hearing.

The G4 embodies all the essential features without compromise and delivers a result that is completely worthy of carrying the name Giya.



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